ATHLETIC TRAINING

THE JOURNAL OF THE NATIONAL ATHLETIC TRAINERS ASSOCIATION

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- Comparison of Quad to Ham Strength Ratios of An Intercollegiate Soccer Team
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VOLUME 16
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SPRING 1981

ATHLETIC TRAINING
THE JOURNAL OF
THE NATIONAL ATHLETIC TRAINERS ASSOCIATION

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CHANGE OF ADDRESS may be made by sending old address and new address with zip code number. Instructions should state whether change is temporary or permanent. Allow thirty days for changeover. Address changes should be sent to: P.O. Box 1865, Greenville, North Carolina 27834.

VOLUME 16, NUMBER 1, SPRING 1981

FEATURES

TIPS FROM THE FIELD

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President's Message

Dear NATA Member:

I am looking forward to seeing most of you at our Annual Meeting and Clinical Symposium in Fort Worth. This year's meeting will be the first time for us to be in a convention center and use multiple hotels. Our housing will be spread out due to our growth in attendance and exhibits.

The members of District Six have organized an excellent program. I'm sure everyone attending will find many things of interest. The local convention committee is to be commended for undertaking and doing such an outstanding job of organizing this year's meeting.

The 1981 Bud Miller Professional Preparation Conferences in Nashville and in Palo Alto were excellent. The clinical program evaluations indicated the information presented was of very high quality. The Certification and Professional Education Committees had, for the first time ever, a joint meeting in Nashville. The meeting gave each committee insight as to how they can help each other and work together for mutual NATA goals. This was a positive step for the continual challenge of keeping our professional standards high.

We are gradually moving toward the centralization of our national office. At the winter Board of Directors meeting, another step toward this goal was taken. Effective July 1, 1981, the Professional Education Committee's secretarial and administrative functions will be taken care of in our Greenville office. This move is our second major step toward centralization. More importantly, this will make it more convenient for over-lapping matters between Professional Education and Certification to be efficiently handled.

Also, your Board of Directors committed to move as many committee functions as possible to our central office at the earliest possible date.

Your national office staff and your Board of Directors are working hard to meet the challenging demands of our growing organization. Keep in mind that what's best for NATA is the primary concern of those serving you. It is important that each of you continue to express your thoughts and ideas if NATA is going to meet the challenges of the 80's.

My best to each of you and I hope to have the opportunity to see you in June during our meeting in Ft. Worth.

Cordially,

Bill

William H. Chambers

Editor's Remarks

Ken Wolfert, ATC
Miami University

DMSO Controversy . . . .

The fact that *Athletic Training* ran an advertisement that has brought concern to many in the last issue does not, of course, imply that we are in favor of this product. Whether we want to admit it or not, this product *is* available and definitely is being used in Sports Medicine, legally and illegally. What is more important is to determine if this product is understood for what it is. We hope that the reaction to all of this would be to hear from more of you like we have in the "Letters to the Editor" part of this issue. We do appreciate your sincere concern over what has happened. It is encouraging to hear what our members feel about such controversy.

Journal Index . . . .

We are happy to include in this issue the complete Index of all articles published in *Athletic Training*, since the Journal first began in 1956. We hope this reference will enable you to be that much more familiar with the what, when, and where of the topics discussed over the past twenty-five years.

Editorial Commentary . . . .

Several years ago Gordy Graham wrote a statement of personal philosophy. As we grow in our relationship within our profession it is becoming increasingly apparent that we must keep our professional, personal, family and spiritual priorities in order. I'm sure that all the "old timers" can relate to Gordy's statements. Maybe younger athletic trainers, just starting to raise a family, can gain insights about this demanding profession. The following was brought to our attention by Dennis Aten, Journal Committee member:

What Price a Profession?

I guess it's a matter of priorities. Many, many years ago I really pushed to get myself involved in my profession, athletic training, and especially involved in my professional organization, the National Athletic Trainers Association. I had a good, full-time college position — teaching and athletic training. My concern for the health and safety of the participating athletes was sincere, especially for the participating high school athlete. Thus, following the NATA guidelines, I developed a curriculum minor in athletic training — to educate the budding teacher for the additional duties as the high school athletic trainer. I became involved in NATA committees, national professional organizations, established and taught in sports medicine workshops, directed the growing number of students in my curriculum, participated in national research projects, in other words, ambitiously attempted to improve my professional image.

Also, I was (and still am) married to a lovely, extremely tolerant wife — tolerant to my constant absences because of my professional involvement and the time requirements of my job. My wife and four active sons live in a neat, modest, middle class home. We have good friends and good neighbors.

Funny, isn't it, how the ambition of youth directs us into academic areas to obtain all the education we can toward our profession. But, then, to me, a combination of things happened. I can't name them all, if any, or put them in any particular order. Maybe I just opened my eyes and observed for the first time what was going on around me, to my friends, to my professional colleagues, and to those I loved, my family. The baby in our family is almost eight years old. I don't think I've really sat and talked or played with him that much. Our oldest, 15, is now 6'3" and 180 pounds. Do I really know him that well? The 13 year old is going to whip me in golf before this summer is out. He just started this summer. I really haven't pitched any batting practices to my 11 year old little leaguer. My God, they are growing fast. Lately, I've been asking myself, "Where did I get the education to raise a family?" Animal instinct? Is it like "seat of the pants flying," personal experience or just dumb luck? Can I make up for my absences in a seemingly all too short summer vacation? Does buying them almost all the things they want make up for my frequent absences?

I guess I'm old fashioned enough to believe it takes a Mother and a Father to raise a family. How can I help guide my sons and share some of the parental responsibilities with my wife when I'm hardly ever home? I'm off on the workshop speeding circuit, professional meetings, or athletic contests devoting my time to educating and helping other parents' sons and daughters, promoting my profession, and I guess, promoting my personal professional image.

Hey, me! Look back on this little epistle and see how you listed your activities. Are they listed in priority order? Probably, instinctively, unthinkingly, yes! Where do my responsibilities really lie? I've spent a little more time with my family these past few months and have really enjoyed it. In ten years, hardly any of them will be at home any more. Think I'd better get involved — with them.

My job is necessary for the existence of my family. My responsibilities there are to the athletes I work with and to our "second" family — the students in the athletic training curriculum. The professional organizations and workshops are still important, but from now on, will not be to the point of having to rearrange family activities. I'll still be concerned and involved, but my family will come first. I guess it's just a matter of personal priorities.

Gordy Graham, ATC, RPT
Mankato State University
Mankato, Minnesota 56001 +

Announcements

Schedule of Future Sites and Dates NATA Certification Examination

Revised: December 1980

REGIONAL

(All regional sites subject to a minimum of six candidates per site and limited to a maximum of thirty candidates.)

January 18, 1981

Eugene, Oregon	Saratoga, California
Fort Worth, Texas	Raleigh, North Carolina
Grossingers, NY (EATA)	Oxford, Ohio
Lexington, Kentucky	(All sites subject to change)

Deadline for requesting application form:
October 15, 1980*
Deadline for returning application:
December 1, 1980*

March 15, 1981

Odessa, Texas	Tucson, Arizona
Oxford, Ohio	West Chester, Pennsylvania
Pullman, Washington	Ann Arbor, Michigan
Raleigh, North Carolina	New Britain, Connecticut
Cedar Falls, Iowa	(All sites subject to change)

Deadline for requesting application form:
December 15, 1980*
Deadline for returning application:
February 1, 1981*

NATIONAL

June 6, 1981 National Convention Site: Fort Worth, Texas (Subject to a maximum of 50 candidates — application accepted in order of remittance — only 25 additional candidates accepted for the written examination. June and August applications are processed under the same deadlines).

August 2, 1981

Ann Arbor, Michigan	Costa Mesa, California
Cedar Falls, Iowa	New Britain, Connecticut
Portland, Oregon	Chattanooga, Tennessee
Oxford, Ohio	West Chester, Pennsylvania
(All sites subject to Change)	Raleigh, North Carolina

Deadline for requesting application form:
March 15, 1981*
Deadline for returning application:
April 30, 1981*

Application forms available from:
NATA Board of Certification
P.O. Drawer 1865
Greenville, NC 27834

(Please indicate the date you wish to take the exam when requesting the application; also indicate the section under which you plan to apply: I-NATA Approved Curriculum, II-Apprenticeship, III-Special Consideration, IV-Physical Therapy).

NOTE: The 1982 Exam dates will approximate the 1981 dates and sites on a regional basis. The national exam will be given at the site of the annual NATA convention with similar numerical limitations.

***All items must be received by the NATA Board of Certification Office by the specified deadline date.**

CORRECTION

In the NATA Constitution, ARTICLE III — Membership should be as follows:

ARTICLE III — Membership

Section I

There shall be eight (8) classes of membership as follows:
(1) Certified
(2) Associate
(3) Retired
(4) Student
(5) Affiliate
(6) Advisory
(7) Allied
(8) Honorary
and no individual shall be eligible for more than one (1) class of membership at the same time.

A Timely Reminder . . .

Your contributions and continuing support to the NATA Scholarship Fund are always welcome and are necessary so that the endowment goal of $500,000 can become a reality. Please remember that our program of financial assistance is a four-fold one that offers scholarships, loans, grants and part-time employment. Organizational support from the NATA to the Fund continues, but your individual contributions are vital to the Scholarship Fund's ultimate success. All contributions are tax deductible. Won't you consider now the importance of your participation in the NATA Scholarship Fund? Make your checks payable to Scholarship Program, and mail them to this address: **William E. Newell, Purdue University Student Hospital, West Lafayette, Indiana 47907.**

Brochure Requests

All requests for the brochure entitled "Careers in Athletic Training" should go to **Charles O. Demers, ATC, Chairman, NATA Career Information Services, Athletic Department, Deerfield Academy, Deerfield, MA 01342.** Single brochures are supplied upon request at no charge. NATA officers and committees, schools having an approved athletic training curriculum, and those having an apprenticeship program are furnished multiple copies of the brochure upon request at no charge. Others requesting multiple copies are asked to pay a charge at 10 cents per copy. +

Welcome to

"THE HEART OF THE WEST"

Tentative Program
1981 National Athletic Trainers Association
Clinical Symposium & Workshop
Fort Worth, Texas • June 7-10, 1981

Sunday, June 7, 1981

A.M. — Pre-Symposium and Workshop
P.M. — Schering Symposium

Monday, June 8, 1981

A.M.
- — Keynote Address — Tom Wilson, ATC, University of Houston
- — Initial Transportation of a Severely Injured Athlete — T.C. "Skip" Cox, ATC, Baylor University
- — The Use of Effective Therapeutic Massage in the Treatment of Athletic Injuries — Becky Bludau, ATC, University of Texas
- — The Use of EGS as a Diagnostic and Treatment Tool for Athletic Injuries — Bernie LaRue, ATC, San Antonio Spurs

P.M.
- — Conditioning in Pre-Season Practice — Bobby Lane, ATC, University of Texas at Arlington
- — Acupuncture — Jim Montgomery, MD, Richardson, Texas
- — Gambling Problems in Collegiate Sports as it Relates to the Athletic Trainer — Hale McMenamin, NCAA.
- — Free Communications

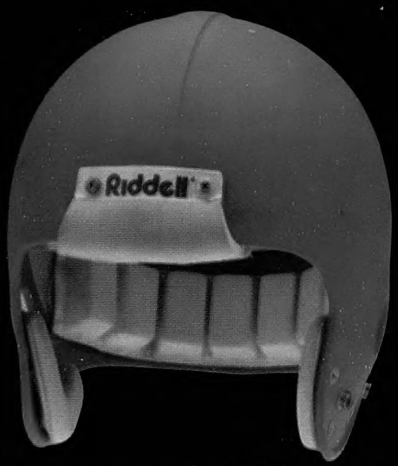
Tuesday, June 9, 1981

A.M.
- — Licensing of the Athletic Trainer — Texas Advisory Board of Athletic Trainers
- — Physiological Consequences of Deconditioning and Retraining — Robert Patton, PhD, North Texas State University
- — Hamstring Injuries — Ken Locker, ATC, Dallas Cowboys
- — Hand Injuries — Dennis Hart, ATC, North Mesquite High School, Texas
- — Evaluation of Knee Injuries — John Gunn, MD, Baylor University
- — Basic Treatment of Myofascial Strains and Sprains — Wayne English, DO, Fort Worth, Texas
- — Arthroscope — Knee — Thurston Dean, MD, Midland, Texas
- — High School Budget Problems — Doug Gibbons, ATC, Highland Park High School; Eddie Lane, ATC, Dallas, Texas

P.M.
- — Ankle Injuries — J. Pat Evans, MD, Dallas, Texas
- — Toe Injuries — Dean Weber, ATC, University of Arkansas
- — Ankle Re-Hab — Larry Gardner, ATC, LPT, Dallas, Texas
- — Organization of a Program for the Medical Care of the Injured Athlete, Ethical Considerations — James A. Bowden, MD, Waco, Texas
- — Aerobic Conditioning as it Relates to Team Sports — Larry Gibbons, MD, Dallas, Texas
- — Arthroscope — Other than Knee — Robert Vandermeer, MD, Southern Methodist University
- — Shoulder Injuries — Louis Levy, MD, Fort Worth, Texas
- — Paper Work vs. People Work — Jerry Rhea, ATC, Atlanta Falcons

Wednesday, June 10

A.M.
- — Joint Stress through High Speed Photographic Analysis — Peter McGrain, PhD, and Marilyn Hinson, PhD, Texas Women's University
- — Weight Training — Tim Kerin, ATC, University of Tennessee
- — How to Prepare the Athlete for Competition — Don Cooper, MD, Oklahoma State University
- — 1982 Convention Preview



What the competition promised, Riddell delivered.

For years, helmet manufacturers have been promising the ultimate helmet.

It took Riddell, the industry leader, to do it.

Riddell proudly introduces the A.C.E.-1 (Air Cushion Engineered) helmet. Now, a player can enjoy the super protection of a helmet that fits like it was custom-made.

Key to the A.C.E.-1's superiority is a revolutionary calibrated sizing system.

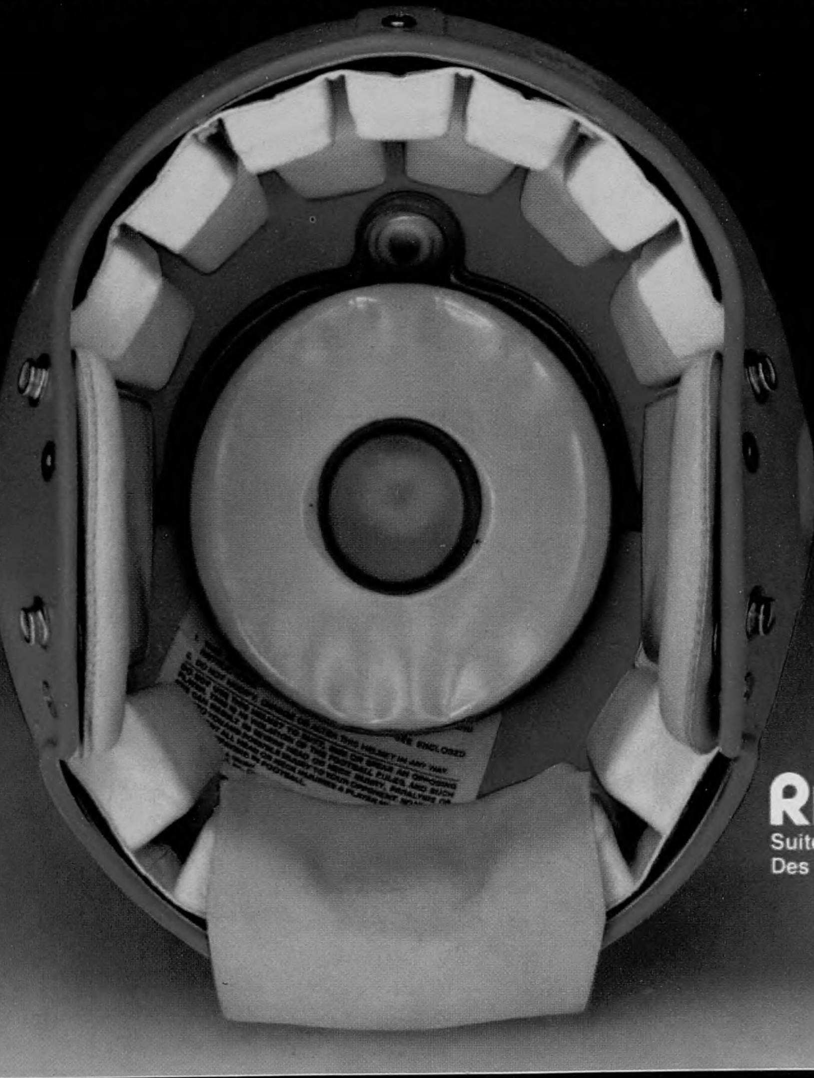
Until A.C.E.-1, players' helmets were fitted according to the circumference of their heads. With the A.C.E.-1, players' heads are measured from front to back with a high precision calipers.

A.C.E.-1 also features a superior, new suspension system consisting of an inflatable donut and side panels and cellular foam pads. Once a player's exact head size has been calibrated, all you have to do is inflate the donut and side panels for a perfect fit.

Of course, the A.C.E.-1 offers all the special features that make all Riddells the choice of over 1,250,000 high school, college and pro players.

All things considered, if there ever is a helmet better than Riddell's A.C.E.-1... you can be sure it will be a Riddell.

For the number of your local Riddell representative, just call 312/299-4030. Because you wouldn't want your players to put on less than the best.



Riddell®
Suite 250—1001 E. Touhy
Des Plaines, IL 60018

Champions aren't b
You have to build t

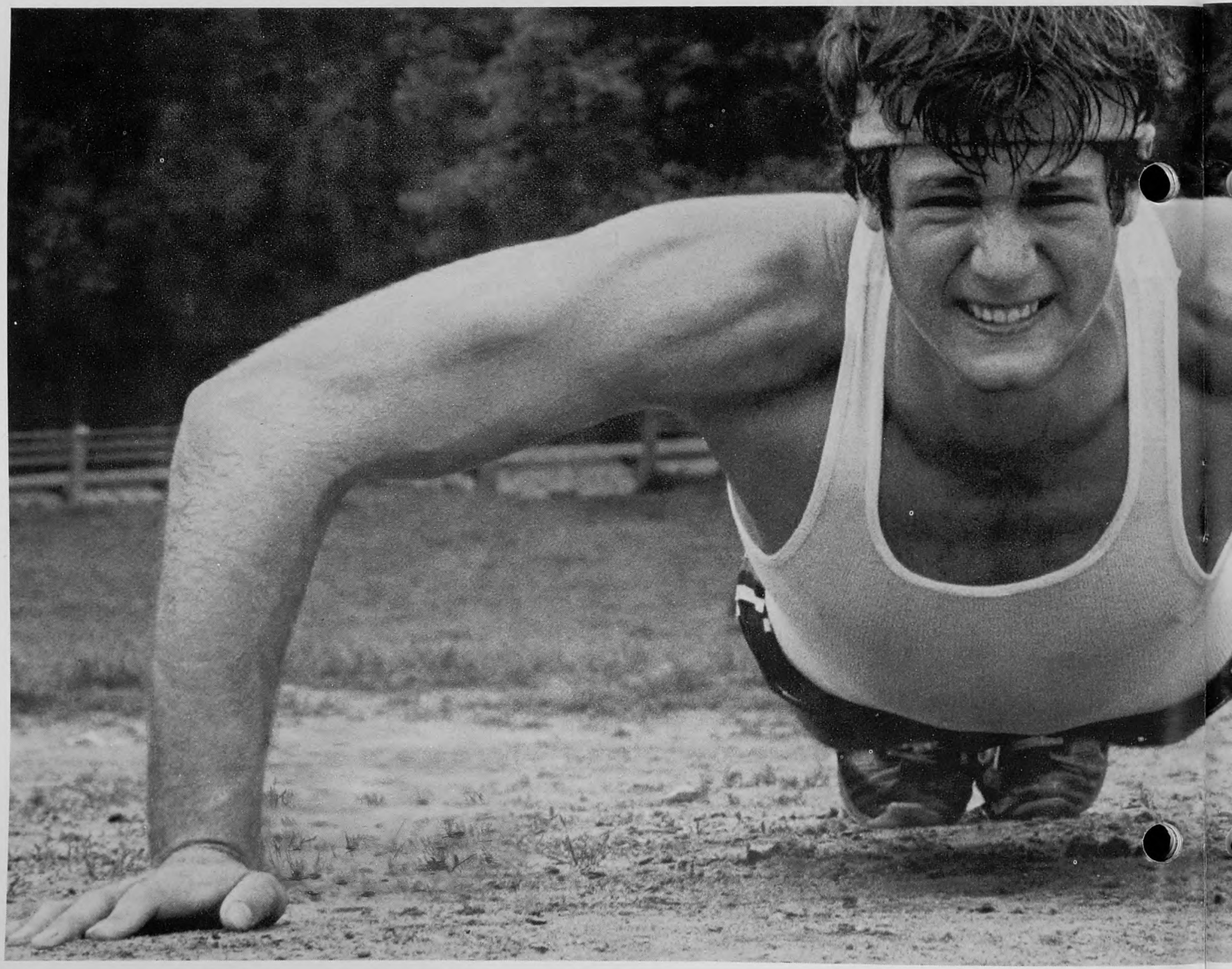
Every coach and trainer knows that. You start with a kid who's got talent and determination. Then, you build him into an athlete.

It takes time and it takes planning, tough training and a good diet. That's where Nutrament® comes in.

Nutrament body building energy food is a complete, scientifically balanced energy food. It has the essential proteins, carbohydrates, vitamins and minerals to build strong muscles, and help athletes perform at their very peak. In addition, Nutrament supplies the calories your athletes need for extra energy during sustained physical competition.

Because Nutrament is a liquid, it digests quickly. So it's less likely to cause stomach upset during competition. That makes it a natural as a pre-game meal.

And as part of a conditioning program, Nutrament is a most valuable player. Athletes



born.
them.

can drink it between meals to gain weight, or in place of meals to lose extra pounds.

What's more, Nutrament tastes as good as it works. There are five great milk-shake flavors to choose from.

So find out why leading coaches and trainers in most major sports make Nutrament part of their regular training program.

Nutrament helps make building champions easier than it looks.

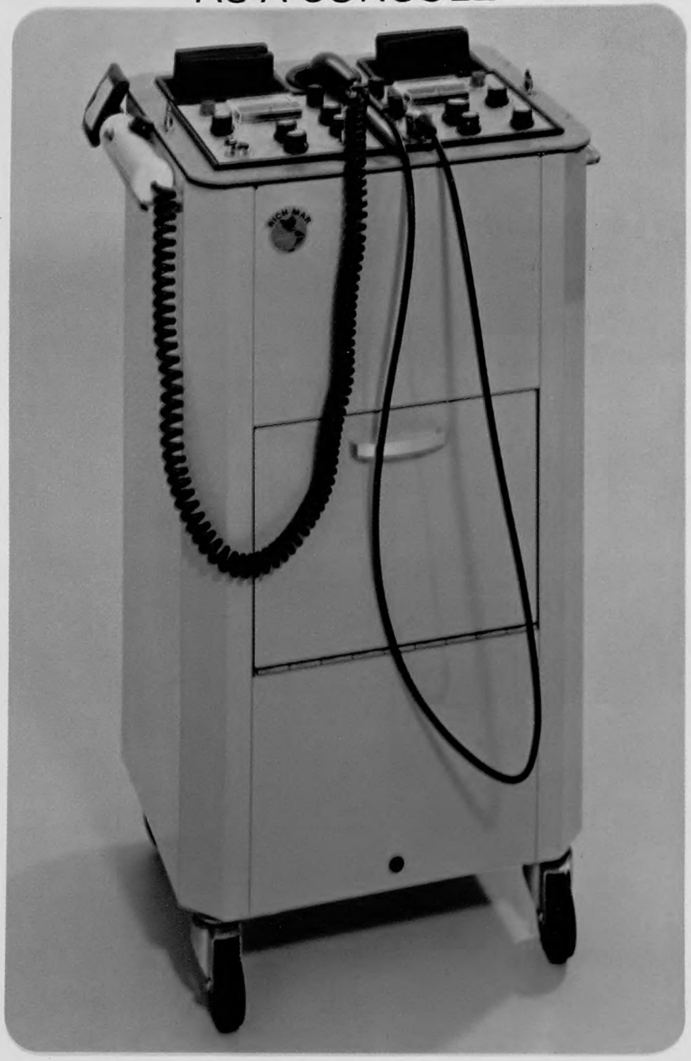
Nutrament®
"gives you energy to burn"™

UNIQUE

THE RICH-MAR VI H.V.

AS A PORTABLE

AS A CONSOLE



THE FIRST FCC APPROVED combination of ultrasound and high voltage galvanic stimulation. Featuring a super smooth galvanic wave, used singly or in combination with ultrasound, thereby offering three modalities — ultrasound — H.V. galvanic and the combination of both.

RM VI-H-V. Specifications:

- Output Pulse Characteristics: High frequency pulse pairs. Single pulse width 45 micro seconds, pulse spacing 10 micro seconds.
- Pulse repetition rate selectable from 5 to 80 pairs per second.
- Pad Alternation rate selectable at 2.5-5 and 10 seconds.
- Output voltage continuously adjustable from 0 to 500 volts peak.
- Circuitry: Monolithic integrated linear circuits and discrete solid state devices.
- Safety Circuits with reset switch.

Accessories:

- 1 — Hand held applicator with fingertip intensity control and circuit opening switch.
- 2 — 4" x 4" pads.
- 1 — 8" x 10" dispersive pad.
- 1 — Spot electrode for localized areas.

Ultrasound Specifications:

• Ultrasound frequency 1 mHz. • Crystal area: 10 sq. cm. • Power output 20 watts, continuous or pulsed. • Pulse duty cycle: Selective from 5% to 25%. • Line voltage: 115-125V/50-60 Hz/1.6A. • Case Size: 16¾" x 13¾" x 7⅝". • Weight: 22 lbs. • FCC U-378.

All RICH-MAR ultrasound and stimulation models are safety engineered to surpass present and proposed hospital electrical safety standards of 50 micro amperes line leakage.

RICH-MAR products are available upon request with appropriate modifications for foreign use.

RICH-MAR CORPORATION TULSA

RICH-MAR CORPORATION
MEDICAL ELECTRONICS DIVISION
P.O. BOX 49
INOLA, OKLAHOMA 74036 U.S.A.
918-543-2222

Letters to the Editor

To the Editor:
The family of Sayers J. 'Bud' Miller, Jr. would like to publicly thank all of those who have contributed so generously to the NATA Sayers J. Miller, Jr. Scholarship Award. Bud devoted his life to the care of the young athlete and to the education of the students in athletic training.
Bud's family is very proud that this award was established in their Dad's name and know he would have been so pleased to have the outstanding students honored for their achievements. Bud truly loved all aspects of the athletic training profession from working with the athletes, to educating the student trainers, to working and sharing with his colleagues for the advancement of the NATA.

Mrs. Sayers J. Miller, Jr.

To NATA Members:
I have recently become involved with a crew program at my school, I would appreciate any information you could provide me with regarding frequency and type of injuries, professional tips, specific rehabilitation programs, etc.

William A. Rice
Athletic Trainer
McCann Center
Marist College
Poughkeepsie, NY 12601

To the Editor:
I am upset to see an advertisement for dimethyl sulfoxide (DMSO) on page 223 of the Winter 1980 issue of *Athletic Training*. Although there is considerable controversy, DMSO's use in medicine has not been approved, to my knowledge, by the Food and Drug Administration, except in the treatment of interstitial cystitis. Furthermore, its use for general medical application is only legal in Florida and Oregon.
I do note that the qualification, "for hobbyists" appears in the ad, but I assume that this refers to its solvent properties. In my opinion, our profession's journal is not the place for hobby advertisements.
In 1977 the NATA Board of Directors voted to no longer accept advertisements for chewing gum in our journal, because of the health hazards accompanying its use while competing in athletics. I believe that we should continue to demonstrate our concern for athletes' health by such example, and that we should reject advertisements for a substance whose use is illegal and unethical by the majority of our profession.

Greg Vergamini
LaCrosse, Wisconsin

To the Editor:
Since DMSO has not been approved for human use, I believe it most inappropriate for our organization to accept such advertisements for publication in the Journal. There is enough faddism in sport without our organization promoting the use of a substance of questionable value (see p. 252, same issue). Assurance of safety and efficacy is paramount. We cannot condone the use of unproven products, devices, remedies, etc. under any circumstance. Acceptance of such advertisements is not only a breech of professional ethics but places in question the credibility of our profession.
I do not know what the Journal policy on advertising is, but I believe it needs to be reviewed. I hope such errors in judgement will not be repeated.
We have a fine Journal, let's keep it that way.

Robert E. Vanni
Macomb, Illinois

To the Editor:
I received the Winter 1980 issue of *Athletic Training* two days ago. I was absolutely appalled to see the advertisement for DMSO that appears on page 223. Just a few months ago we all received a letter from Bill Chambers regarding the dispensing and use of prescription medication. I am aware of the Journal's stand on advertising as stated. Unfortunately, I can not accept the neutrality implied with regard to this particular case.
DMSO is not approved for human use by the United States Food and Drug Administration, except for research. To put it bluntly, DMSO is an illegal substance. In addition, the advertisement itself is in very poor taste. The reference for the use by "hobbyists" is outrageously unprofessional although necessary from the manufacturers standpoint. It in no way relates to the field of athletic training, which I assume is a requirement of the merchandise that we advertise.
Our organization is currently in the process of upgrading our image within the health care and athletic community through its efforts for state licensure and professional education. In your editors remarks section of the current issue you include a commentary by John Sciera about the professionalism of athletic training. We consider ourselves health care professionals. I am not sure others would agree with us after seeing this type of advertising in our journal.
Needless to say, I hope that in the future more serious considerations will be given to the advertising policy by the Journal Committee.

Joseph J. Vegso
Philadelphia, Pennsylvania

To the Editor:
It was a great degree of astonishment to find an advertisement for DMSO on page 223 of the current 1980 Winter issue of *Athletic Training*. Knowing that the substance is very suspect and legally permissable for use in humans for very restrictive use with certain pathologies, I would like to know why the advertisement was allowed into the Journal.
We all know that there is clandestine use of this substance in sports-medicine. But this situation does not override the fact that DMSO is stringently restricted by federal and state health and medical agencies.
At the present time, many athletic trainers in many states are involved with political action, specifically licensing or credentialing the profession. Many eyes are on the athletic training profession to see if athletic trainers are responsible enough and possess a legitimate structure of ethics and professional character to be granted the rights under licensure or other forms of regulatory credentialing. The presence of such ads as the DMSO one in the only publication closely associated with athletic training can only serve as fuel for those groups or individuals who oppose current political undertakings by athletic trainers.
It would be hoped that future advertising would be scrutinized for the material's effect on the profession as a

whole. The Journal serves as an invaluable mirror for athletic training, it reflects the growth of the profession and one certainly does not want to see its image tarnished by irresponsible advertising.

Paul G. Slocum
Bloomsburg, Pennsylvania

To the Editor:

This letter is being written by a concerned member of our professional organization.

In the latest issue (Winter 1980) of the Journal of the National Athletic Trainers Association, one finds an advertisement on page 223 by Olympic Labs in Greensboro, NC, for Dimethyl Sulfoxide (DMSO). I thought that the NATA, along with the NCAA has taken a stand against the use of ergogenic aids of any kind in order to attempt to increase one's athletic performance. In fact, in the same issue, on page 257, section 2 of the Code of Ethics states "The membership of the National Athletic Trainers Association does not condone the unauthorized and/or non-therapeutic use of drugs. The Association recognizes that the best and safest program is comprised of good conditioning and athletic training principles."

I realize that on the index page there is a disclaimer stating, "Although advertising is screened, acceptance of the advertisement does not necessarily imply NATA endorsement of the product or the views expressed." But also, under the list of advertisers on page 264, it states, "Patronize *Athletic Training* Advertisers."

What I do not understand is how a professional organization, responsible for the health care of athletes, and who has made a stand against the use of ergogenic aids, can morally accept and publish an advertisement for a drug banned by the Federal Drug Administration. I do realize that the advertisement states, "For Hobbyists." But, everyone knows the intent of a drug advertisement in a journal of a para-medical organization.

I fail to see how an organization working towards licensure and, who is attempting to reach the recognized status of a professional in the field of Sports Medicine, can accept this brand of advertising. It would seem that the organization just "took two steps backwards" in its licensing attempts.

I would hope that advertisements of this nature will no longer be tolerated in our journal.

Phillip A. Prather
San Diego, California

To the Editor:

I am concerned by the ad for Dimethyl Sulfoxide (DMSO) in the 1980 Winter Journal. DMSO is a drug that is not approved by the FDA. It is only approved for use of general medication in Florida and Oregon and can be used by humans for interstitial cystitis.

It is true that it can be used as an industrial solvent and therefore might be of use to "hobbyists." When has our journal catered to hobbyists? If indeed we are a professional organization I find it hard to accept advertising of unapproved drugs in our journal.

David Leigh
LaCrosse, Wisconsin

To the Editor:

I have an objection to the ad on page 223 in the Winter 1980 "NATA Journal" regarding DMSO.

From an innocent or naive standpoint, why are we now promoting products not related to athletics? From a professional point of view, I think it is an insult to promote a drug not recognized by the FDA for human use. It is ironic that later on in the Journal there is an article titled "Adverse Drug Interaction in Sports Medicine," plus in the "Abstracts" there is an article: "DMSO: No Proof of 'Miracles'." If this is supposed to be our 'professional(?)' journal, why does it promote a drug that is not an over the counter medication, and can be obtained legally by prescription in only one state?

It is true that DMSO might be useful (according to some athletes' testimonials) and that some athletic trainers are promoting its usage. But, in this era of legal liability it would behoove the athletic trainer to think twice before condoning or administering an illegal drug of which many of the biological and physiological effects are still unknown.

Michael Bell
Minneapolis, Minnesota

To the Editor:

As one who is pleased with the quality of *Athletic Training* and appreciates the efforts of the staff involved, I do want to state an objection to the Winter 1980 issue. I find it, at the least, in bad taste to carry an ad for DMSO (page 223) in this issue. It is especially ironic that the ad is also carried in the same issue that contains (1) an abstract of an article from the *FDA Consumer* describing the illegal and possibly dangerous use of DMSO, and (2) the NATA Code of Ethics which describes the official position of the NATA on "the unauthorized and/or non-therapeutic use of drugs."

I realize the official advertising policy of the journal and recognize the fact that the ad is within the legal rights of the company placing it and the NATA. My objection is that it is hard enough to educate our coaches and athletes on these "athletic fads" without having them see the availability of such products in our own publication. I request that the journal screen advertising more closely in an effort to avoid such problems.

Thank you for your consideration of this matter. Again, my compliments to the staff for an otherwise fine publication.

Larry Leverenz
Macomb, Illinois +

"You can build a Universal® Circuit Weight training system one piece at a time."

Chuck Coker

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DVR Leg Squat

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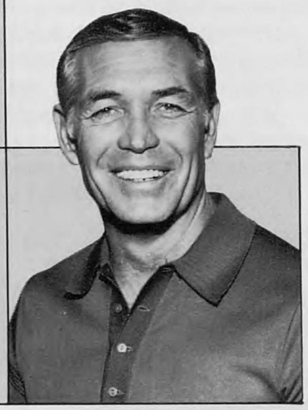
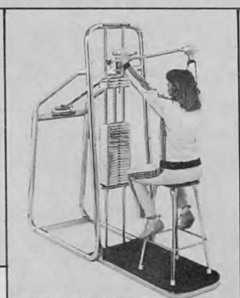
DVR Chest Press

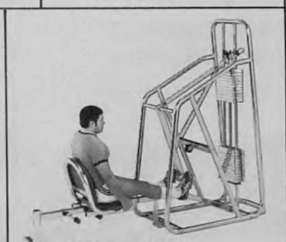
DVR Leg Curl



DVR Arm Curl



DVR Shoulder Press



DVR Leg Press

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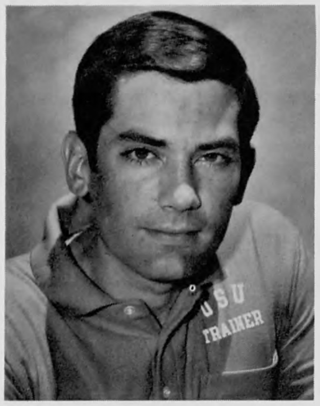
Calendar of Events



Jeff Fair, ATC, MS
Oklahoma State University

April, 1981

3-4 1981 Athletic Training Workshop, Minneapolis, Minnesota. Contact Jeff Monroe, Trainer, Athletic Department, University of Minnesota, Minneapolis, Minnesota 55418.

3-5 Sixth Annual Dogwood Conference, Atlanta, Georgia. Contact Ronald G. Peyton, The Sports Medicine Education Institute, Inc., Suite 400, 20 Linden Avenue, N.E., Atlanta, Georgia 30308.

4 2nd Annual Bridgeport Sports Medicine Symposium, Bridgeport, Connecticut.

11 Second Annual Sports Medicine Seminar, Division of Athletic Medicine, Michigan State University, East Lansing, Michigan. Contact Kathleen Heck or Bill Hyncik, Department of Intercollegiate Athletics, Michigan State University, East Lansing, Michigan 48824.

13-17 American Alliance for Health, Physical Education, Recreation, and Dance — 96th Convention, Boston, MA. Contact: AAHPERD, 1900 Association Drive, Reston, VA 22091.

18 Cybex/Isokinetic Clinical Workshop, LaCrosse, Wisconsin. Contact George J. Davies, Orthopaedic and Sports Physical Therapy, c/o Bethany St. Joseph Health Care Center, 2501 Shelby Road, LaCrosse, Wisconsin 54601.

23-24 Sports Medicine Symposium — 1981, The Cleveland Clinic Foundation, Cleveland, Ohio. Contact Center for Continuing Medical Education, The Cleveland Clinic Education Foundation, 9500 Euclid Avenue, Cleveland, Ohio 44106.

23-24 Medical Aspects of Jogging, Running and Aerobic Exercise. Sponsored by the Department of Orthopaedic Surgery and the Sports Medicine Center at the University of Pennsylvania. Contact Ms. Nancy Wink, CME Program Director, University of Pennsylvania School of Medicine 19104.

24-26 Second Annual Sportsmedicine Conference, Spokane, Washington. Contact Nancy Fike, Spokane Sportsmedicine, Suite 560, W. 105-8th, Spokane, Washington 99204.

29 Prevention and Recognition of Athletic Injuries: A Continuing Education Approach, Dayton, Ohio. Contact David Shon, Program Chairman, Athletic Department, Wright State University, Dayton, Ohio 45435.

30-May 1 3rd Annual Dance Medicine Seminar, Cincinnati, Ohio. Contact Rosie Biedenbach, Department of Orthopaedics, University of Cincinnati Medical Center, 3363 Medical Science Building, Cincinnati, Ohio 45267.

May, 1981

1-3 Orthopaedics and Sportsmedicine Seminar, Las Vegas, Nevada. Contact Vi Nicall, Cybex Division of Lumex, 2100 Smithtown Avenue, Ronkonkoma, New York 11779.

16 6th Annual Sports Medicine Seminar, Salisbury State College, Salisbury, Maryland 21801.

22-23 "Tennis Anyone? Common Injuries That Plague Tennis Players," The Sports Medicine Education Institute, Hilton Head, South Carolina. Contact The Sports Medicine Education Institute, Inc., 20 Linden Avenue, N.E., Suite 400, Atlanta, Georgia 30308.

23 Cybex/Isokinetic Clinical Workshop, LaCrosse, Wisconsin. Contact George J. Davies, Orthopaedic and Sports Physical Therapy, c/o Bethany St. Joseph Health Care Center, 2501 Shelby Road, LaCrosse, Wisconsin 54601.

27-30 American College of Sports Medicine, Annual Meeting, Miami, FL. Contact: AMCSM, 1440 Monroe Street, Madison, WI 53706.

June, 1981

4-6 American Academy of Podiatric Sports Medicine Annual Meeting and Sports Medicine Seminar, A Multidisciplinary Approach, Anaheim, California. Contact John W. Pagliano, General Chairman, 4301 Atlatic, Suite 6, Long Bech, California 90807.

7-10 32nd Annual NATA Meeting & Clinical Symposium, Fort Worth, Texas. Contact NATA, P.O. Box 1865, Greenville, North Carolina 27834.

13 Cybex/Isokinetic Clinical Workshop, LaCrosse, Wisconsin. Contact George J. Davies, Orthopaedic and Sports Physical Therapy, c/o Bethany St. Joseph Health Care Center, 2501 Shelby Road, LaCrosse, Wisconsin 54601.

14-19 12th Annual Miami University Sports Medicine Workshop — Advanced only, Oxford, Ohio. Contact Ken Wolfert, Sports Medicine Services, Miami University, Oxford, Ohio 45056.

17-20 9th Annual Art and Science of Sports Medicine—1981, Charlottesville, Virginia. Contact Jim Gibson, Coordinator, Sports Medicine Conference, Memorial Gymnasium, Charlottesville, Virginia 22903.

21-23 Athletic Training Workshop for High School Students, Pittsburgh, Pennsylvania. Contact: David Perrin, Athletic Training Education Program, 140 Trees Hall, University of Pittsburgh, Pittsburgh, PA 15261.

Cramer Student Athletic Trainer Workshops

Dates	Sites
June 14-17	Kent State University Kent, Ohio
June 14-17	North Alabama University Florence, Alabama
June 14-17	Canisius College Buffalo, New York
June 21-24	Arkansas State University Jonesboro, Arkansas
June 21-24	Florida State University Tallahassee, Florida
June 21-24	Southern Colorado University Pueblo, Colorado
June 21-24	Tulsa University Tulsa, Oklahoma
June 28-July 1	California State College California, Pennsylvania
June 28-July 1	Northeast Louisiana University Monroe, Louisiana
June 28-July 1	North Texas State University Denton, Texas
June 28-July 1	Clemson University Clemson, South Carolina

Cramer Coaches Athletic Training Workshops

Dates	Sites
June 1-5	Fort Hays State University Hays, Kansas
June 15-19	University of Florida Gainesville, Florida
June 15-19	University of Oregon Eugene, Oregon
June 22-26	Montclair State University Upper Montclair, New Jersey
June 22-26	Syracuse University Syracuse, New York
June 29-July 3	University of Illinois Champaign, Illinois
June 29-July 3	Bowling Green State University Bowling Green, Ohio
June 29-July 3	University of North Carolina-Wilmington Wilmington, North Carolina

Athletic Training will be happy to list events of interest to persons involved in sports medicine, providing we receive the information at least two months in advance of publication. Please include all pertinent information and the name and address of the person to contact for further information. This information should be sent to **Jeff Fair, Athletic Department, Oklahoma State University, Stillwater, Oklahoma 74078.**

Current Literature

Ed Christman, ATC, MEd
College of William and Mary

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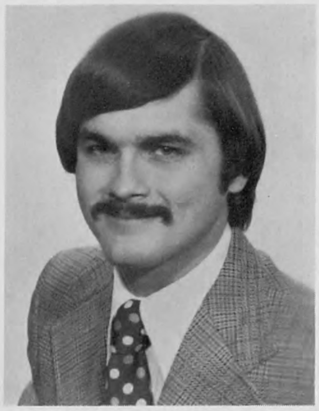
Book Reviews



BOOK REVIEW EDITOR
Don Kaverman, ATC, MA

Physiology of Exercise for Physical Education and Athletics
Herbert A. deVries
3rd edition
577 pages — illustrated
List price — $17.30
William C. Brown Co.
2460 Kerper Blvd.
Dubuque, Iowa 52001
1980

This publication represents a substantial revision of previous editions with a great deal of new bibliographic material.

The author has an excellent presentation concept. The first portion is a review of basic physiology, concentrating on the various body systems and their function during exercise. Of particular interest are the chapters on the heart, circulatory system and gas transport, and internal respiration. The depth of presentation is most suited to students with an introductory knowledge of human physiology. In condensing the material, deVries often acknowledges the reader may need a more comprehensive review and refers the reader to more advanced human physiology texts. The discussion of exercise metabolism encompasses both aerobic and anaerobic conditions. This is in contrast to texts which discuss only aerobic metabolism and, consequently, leave the reader with the idea that this covers the field.

The second portion deals with applications of exercise related physiology to health. There is an overview of the effects of exercise on the function of various body parts and systems. There is a good discussion of exercise testing methods and prescription, but the highlight of this section is the discussion of weight control and exercise. DeVries points out that while it is popular to deride exercise as a weight control device, it is a positive factor, along with diet, in balanced maintenance and weight loss programs.

The third section reviews the training and conditioning of athletes. This section contains excellent discussions of strength, endurance, efficiency, nutrition and special aids to performance. The real highlights, however, are the discussions of speed, flexibility, muscle soreness and warmup. This is excellent information of which all trainers should be aware.

James M. Rankin

Medicine for Sports
By: David French Apple, MD and John D. Cantwell, MD
List Price: $21.50
241 pages — illustrated
Year Book Medical Publishers, Inc.
35 E. Wacker Dr.
Chicago, IL 60601
1979

Medicine for Sports is the joint effort of Dr. David Apple, Team Physician for the Atlanta Hawks, and Dr. John Cantwell, Team Physician for the Atlanta Braves. Although the text does not represent a comprehensive textbook of sports medicine, it is a useful contribution to the literature. The authors emphasize the importance of practicing sound, prudent medicine in the athletic setting of the locker or training room.

Topics covered include physical fitness, sports physiology, testing and evaluation of athletic cardiovascular problems, nutrition, and a particularly useful section on the problems in children's sports.

Medicine for Sports examines a variety of areas and injury problems in depth. By contrast, other topics, such as the use of modalities and the rehabilitation of injuries, are not thoroughly discussed. This is in keeping with the author's viewpoint that theirs is not a comprehensive text. The book serves as an enjoyable and informative supplement to other texts. It is of most value to physicians, coaches, and athletic trainers who wish to increase their knowledge of sports injuries.

Kathy Heck

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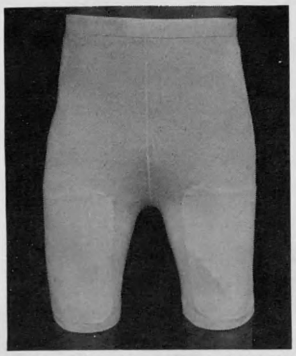

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RECOIL TURBULENCE is potentially reduced in the abdomen, thigh and groin in the same manner that taping supports ankles and knees in football or an athletic supporter in high jumping, hurdling or other activities.

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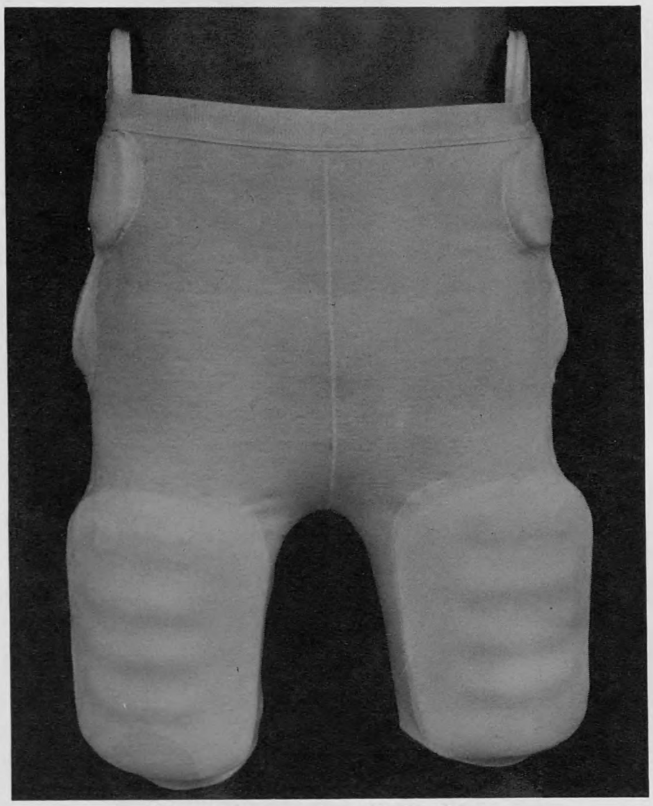
A reduction in peripheral vascular pooling, edema, loss of heat, and muscle fatigue is achieved via counter pressure thus minimizing peripheral vascular capacitance and increasing central venous return.

The "CPS" Girdle offers support via counter pressure from the nylon/spandex fabric construction. Physiological and psychological benefits are derived via the "CPS" System of Player Protection. The "CPS" System has been designed as a multi-purpose garment for football, baseball, basketball, track and soccer players. Players wishing to wear the "CPS" 49 Long Leg Girdle Shell for support without pads, may desire to size down.



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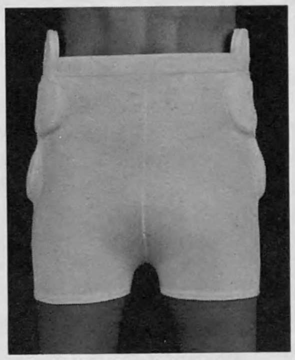

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Medium	32″-38″
Large	38″-44″

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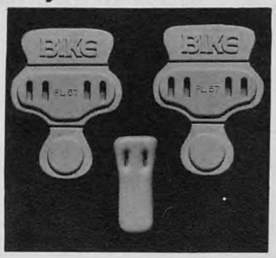
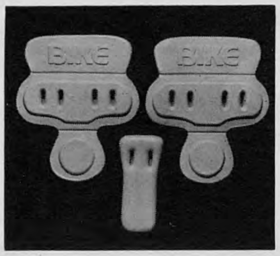
Pro-lite® Hip Pad Sets
Pro-lite Hip Pads are designed to be extremely lightweight sets of three foam cushioned high rise hip pads. Thick foam padding provides maximum protection with a minimum of weight. Designed with the players in mind to offer customized hip protection via Pro-lite's unique forming ability using body heat. Slots are provided for belts. Pro-lite Hip Pads are designed for use with the BIKE 'CPS" 48 or "CPS" 49 Girdle Shells.

BIKE offers two sizes of the Pro-Lite Hip Pads:

PL 57 Hip Pad Set - Regular
Recommended for varsity offensive and defensive backs, quarterbacks, and wide receivers.

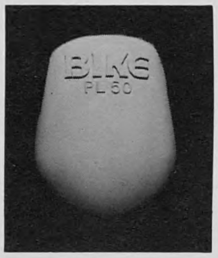


PL 47 Hip Pad Set - Large
Recommended for all players including backs, linemen and linebackers.



Pro-lite® Knee Pads
Pro-Lite Knee Pads are designed to be light-weight while providing maximum knee protection. Two sizes are provided by the Pro-lite Knee Pad System:

PL 50 Knee Pad - Regular
Regular universal knee pad with ½" foam padding in the cup. Recommended for all varsity players.



PL 40 Knee Pad - Large
1" extra length is provided to maximize player knee protection in the grey area between the knee and thigh guard. ⅝" padding in the cup. Lightweight and durable. Recommended for all varsity players.

Weight Comparison

Hip Pads (SET)	Thigh Guards (PR)	Knee Pads (PR)
Conventional - 7½ oz.	Conventional - 7½ oz.	Conventional - 2¼ oz.
PL 47 Large - 2½ oz.	PL 45 Large - 6 oz.	PL 47 Large - 2 oz.
PL 57 Regular - 1½ oz.	PL 55 Regular - 4½ oz.	PL 57 Regular - ¾ oz.

Pro-lite® Thigh Guards
The Pro-lite® line of thigh guards is especially designed to meet the needs of today's players. Pro-lite thigh guards are extremely lightweight with excellent absorption and shock attenuation properties. Cushion foam padding covers heavy-duty plastic grids. Two sizes are provided.

PL 55 Thigh Guard - Regular
Extremely lightweight player protection. Recommended for all varsity backs and receivers.

PL 45 Thigh Guard - Large
Lightweight player protection. Recommended for all varsity players including linemen, linebackers, offensive and defensive backs, quarterbacks, and wide receivers.

No. 20 Football Hand Glove
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Introducing "THE" Football Hand Glove designed by coaches, trainers, equipment managers, and players for today's varsity athletes. The No. 20 Football Hand Glove features thick foam molded padding for maximum protection of the hand and knuckles. Adjustable 1½" hook and loop elastic closure assures a firm, comfortable fit. Finger holes are designed to fit today's collegiate and high school athletes. A tough naugahyde covering insures durability.

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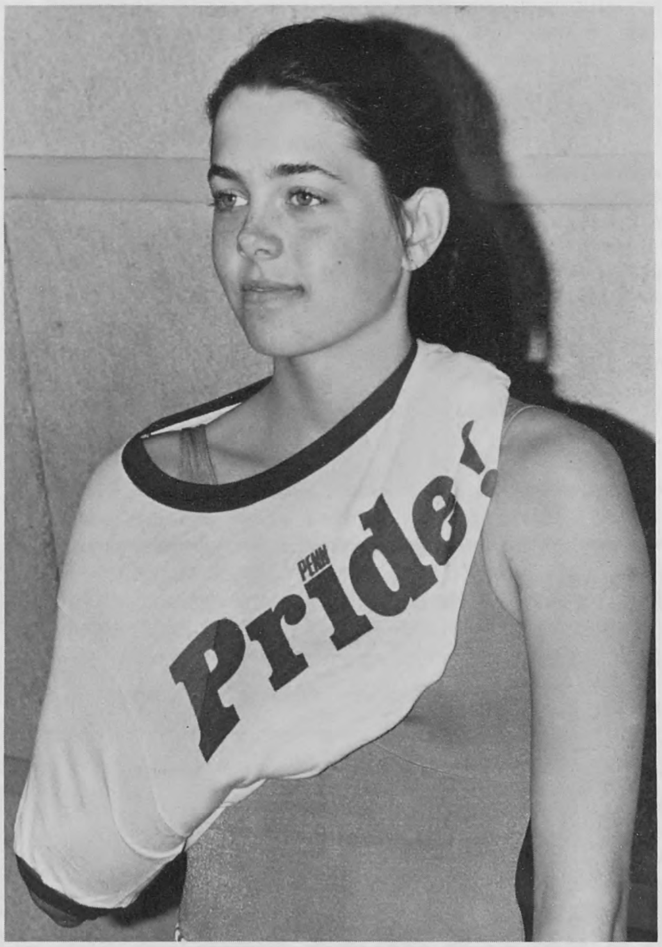

PAUL LYMAN

Ms. Wickel is a staff athletic trainer-therapist at Princeton University, Princeton, New Jersey 08544.

A Tip From the Field

An Immediate, Temporary Arm Sling

Doris A. Wickel, RPT, ATC

One thing a trainer never seems to have enough of, is pockets for supplies. This suggestion provides upper extremity support without the use of a triangular bandage or cravat.

Following the initial evaluation of an upper extremity injury, the question is rarely whether to support or not support. More commonly the question is, "what is available," or "how soon can I support this injured extremity." The player's loose fitting T-shirt provides an immediate answer.

It is not an uncommon practice to have an athlete support an injured extremity with the uninjured arm until a standard sling is available. It is the purpose of this suggestion to offer an alternative to this method.

Procedure

1. Slip the uninjured arm out of the shirt sleeve.
2. Slip the injured arm out of the shirt sleeve. (Depending on the type of injury and the size of the shirt, it may be necessary to slip the shirt over the head before freeing the injured arm from the shirt.)
3. With the shirt in place over the shoulders, sleeves free, pull the sleeve of the injured arm down to the elbow.
4. Rest the elbow in the sleeve.
5. Rest the hand along the neck band of the shirt or wrapped in the folds of the shirt.
6. Adjust the level of support by moving the shoulder seam on the affected side. Placing the shoulder seam up and behind the shoulder line will increse the lift of the arm.

Summary

The use of an injured athlete's shirt for an arm sling provides an immediate alternative to the self-support method which employs the use of the athlete's uninjured arm. The use of the shirt frees the athlete's good arm for balance and support, without jeopardizing the position of the injured extremity. The shirt provides consistent support while enabling the player to be in charge of any needs that are within reach.

As is true of all techniques in athletic training, this method is not applicable to all situations, and is not presented with that intent. +

Editor's Note: Anyone wishing to have an idea, technique, etc. considered for this section should send one copy to **Ken Wolfert, Miami University, Oxford, Ohio 45056.** *Copy should be typewritten, brief, and concise, using high quality illustrations and/or black and white glossy prints.*

Two Effective Flexibility Methods

William L. Cornelius, PhD

Introduction

Movements found in athletic oriented activity require a quality of efficiency and rely, in part, on adequate joint range of motion. Continued improvements in mechanical efficiency are more likely when effective flexibility procedures are utilized. The athletic trainer, therefore, should be aware of ways in which flexibility can be improved. According to Broer(2) and Cooper and Fair(3) movement patterns possessing efficiency are partly dependent upon normal joint range of motion. Cooper and Fair(4) and Aten and Knight(1) further indicated that flexibility can improve performance and can reduce the frequency of injuries. Consequently, it is presumable that excellence in performing various movement patterns would be difficult to achieve without adequate flexibility.

Because of the importance now placed on joint range of motion in athletic programs, it is necessary that athletic trainers and coaches incorporate effective flexibility methods which have been scientifically substantiated in the laboratory. Holt, Travis, and Okita(9), Tanigawa(13), Cooper and Fair(3), and Leach, Jones, and O'Connor(11) indicated that proper stretching techniques would provide valuable results.

Effective Flexibility Practices

There appears to be several basic practices characterized in effective flexibility methods. Associated with these successful stretching procedures are static flexibility maneuvers, slow movements which are non-percussive, relaxation of soft tissues and low muscle bundle tension. deVries(7) and Steinhaus(12) suggested that for a muscle to be effectively stretched, muscle bundle tension and sensory activity must be minimal. deVries(6) found the well known static stretch technique to promote the relaxation of soft tissues around and within the muscle and to improve joint range of motion. Walker(14) further supported these findings by obtaining low integrated electromyographic measures during a static stretch.

Research expanded on the use of a static flexibility maneuver and incorporated it as an integral part of more effective flexibility methods. Cornelius(5), Holt et. al.(9), Tanigawa(13) have provided support for new approaches based on Proprioceptive Neuromuscular Facilitation (PNF). Contemporary PNF techniques are based on earlier therapeutic work completed by Kabat(10). Holt et. al.(9) found PNF oriented flexibility methods incorporating muscle contraction techniques prior to a static stretch were more effective than the static flexibility method. Because of the positive influence on sensory mechanisms and the lowering of tension, these methods have successfully added to the effectiveness of flexibility exercising. Windell and Decker(15) explained that all PNF techniques used for soft tissue relaxation were based upon inhibition of the anterior horn cells. This inhibition phenomenon results in reduction of sensory activity leading to relaxation of the muscle bundle and associated soft tissues. According to Holt et. al.(9), PNF techniques increase joint range of motion by utilizing principles of successive induction (maximum contraction of agonists and subsequent concentric contraction of antagonists), relaxation of muscle tissues, and reciprocal innervation (concentric contraction of antagonists and relaxation of agonists). Windell and Decker(15) suggested that PNF techniques using the combination of muscle contraction and stretch were based upon the reversal of antagonists procedure.

Two flexibility methods, 3-PIC and 0-PIC, utilize PNF techniques and have been tested under laboratory conditions. Cornelius(5) found both flexibility methods to significantly increase joint range of motion at the hip when compared with a passive-static-flexibility method ($p < .05$). The 3-PIC flexibility method involves a passive static flexibility (PSF) maneuver of the agonist, three-second maximum voluntary isometric contraction (MVIC) of the agonist, concentric contraction of the antagonist, and PSF maneuver of the agonist. Wendell and

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Decker(15) suggested that these procedures are associated with the hold-relax PNF technique. The O-PIC flexibility method incorporates a PSF maneuver of the agonist, concentric contraction of the antagonist, PSF maneuver of the agonist. Wendell and Decker(15) reported the concentric contraction of the antagonist muscle group preceded by the flexibility maneuver affiliate with the contract-relax PNF technique. Because the 0-PIC method does not include a MVIC, it can be administered with slightly less time expenditure than can the 3-PIC flexibility method. Although Holt(8) suggested using a six-second time interval with the MVIC technique, Cornelius (5) discovered that no significant difference existed between the six-second and three-second MVIC used subsequent to a PSF maneuver at the hip joint.

In order to provide examples of the 3-PIC and 0-PIC flexibility methods, the shoulder and hip joints were selected. Illustrations 1-4 depict the 3-PIC flexibility method utilized in stretching the shoulder extensor muscles and related soft tissues. Illustrations 5-7 involve the 0-PIC flexibility method incorporated in stretching the hip extensor muscles and related soft tissues.

Characteristics Common to 3-PIC and 0-PIC

There are characteristics common to the 3-PIC and 0-PIC flexibility methods. Both methods utilize a concentric muscle contraction of the antagonist muscle group between PSF maneuvers. The initial and final PSF maneuvers are created by the supervisor without active movement from the subject and provide the angular motion needed to move through the desired range of motion. Body segments involved represent levers acting as rigid bars moving in an arc about fixed points. The segments are held straight and moved at a slow, constant rate with explosive movements discouraged. Subjects are reminded to relax before each exercise. When the subject is aware of tension during a PSF maneuver, passive motion is discontinued and the static stretch is maintained. The supervisor is, therefore, notified of the tension before pain is perceived.

Description of the 3-PIC Flexibility Method

The angular displacement of the humerus takes place in the sagittal plane about the frontal axis at the glenohumeral joint. There are four integral parts to the 3-PIC flexibility exercise. Illustraion 1 represents a slow, passive stretch of the shoulder extensor muscle group (agonist) which initiates the exercise. When the subject perceives tension at the posterior aspect of the shoulder, the passive maneuver ceases. Illustration 2 reveals a

Illustration 1

Illustration 2

Illustration 3

Illustration 4

three-second MVIC executed by the subject against the resistance of the supervisor. The MVIC is executed by the active contraction of the shoulder extensor muscle group (agonist). Illustration 3 depicts the subject actively flexing the shoulder by concentrically contracting the shoulder flexor muscle group (antagonist). There is no assistance given by the supervisor during this phase. Illustration 4 represents the last phase of the 3-PIC exercise which begins when active flexion ceases. The supervisor gently initiates a passive shoulder flexion movement until the subject perceives tension posterior to the shoulder. A PSF maneuver terminates the exercise.

Description of the 0-PIC Flexibility Method

The angular displacement of the femur takes place in the sagittal plane about the frontal axis at the acetabulum joint. There are three integral parts to the 0-PIC flexibility exercise. Illustration 5 depicts the initial movement consisting of a slow, passive stretch of the hip extensor muscle group (agonist).

Illustration 5

Illustration 6

Illustration 7

Passive motion ceases when the subject perceives tension at the popliteal fossa posterior to the knee. Illustration 6 represents a concentric contraction of the hip flexors. Because a MVIC was not utilized, subject activity flexes the hip joint during this phase by concentrically contracting the hip flexor muscle group (antagonist). There is no assistance given by the supervisor during this phase. Illustration 7 shows the final part which begins when active hip flexion ceases. The supervisor gently initiates a passive hip flexion movement and continues until the subject perceives tension posterior to the knee. A PSF maneuver terminates the exercise.

Summary

Because athletic performance is continually improving, mechanical efficiency must be viewed as basic if individuals are to successfully compete with contemporary counterparts. Effective flexibility procedures are one of the essential tools by which excellence can be attained. The 3-PIC flexibility method and the 0-PIC flexibility method have been tested under laboratory conditions and have been found to be effective at increasing joint range of motion and are quickly and easily administered. +

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A Tip From the Field

An Easy-to-Make Shin Protector

Shaun McCarthy, ATC

Baseball may be classified as a non-contact sport, but for those who watch or play, it is evident that not only collisions between players occur, but also players are frequently struck with the ball in several body areas. One such injury is a batted ball striking the hitter in the anterior aspect of the lower leg and/or the ankle region.

This condition seems to occur because the hitter is swinging the bat unevenly causing the ball to descend downward usually striking the forward leg (left leg if it is a right handed hitter or right if it's a left-handed hitter). Injury could occur to any of the following areas:

1. Contusion to the subcutaneous portion of the tibia
2. Periostitis (inflammation of the periosteum, the covering of all bone surfaces). This could occur since there is little muscular tissue covering the anterior compartment to absorb the shock of the blow. Osteomyelitis, an inflammatory condition which leads to bone deterioration could follow if adequate treatment isn't received.
3. Hematoma formation. Two points need to be remembered here. First, absorption of the blood must be encouraged after it is certain bleeding has been halted. If the blood coagulates, removal of this blood through absorption will be impossible and surgical Evacuation may have to be used to hasten the recovery period. Secondly, a severe hematoma could develop into Anterior Compartment Syndrome, a surgical emergency since complete muscular function could result.

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The initial treatment of a blow to this area should follow the RICE principle — Rest, Ice, Compression, and Elevation. Moist heat, massage and ultra sound (if available) can be started to aid the absorption of hematoma when bleeding has stopped.

In dealing with all injuries, the goal of physicians, coaches, and trainers should involve prevention of the injury when possible. Padding the area can greatly reduce the severity of injury to the area. While commercial shin protectors are available, as those used by soccer players, it is possible to make one to fit the individual player and provide maximum protection to the area. Ken Carson, head trainer with the Toronto Blue Jays, designed the pad pictured. Materials necessary were Orthoplast, two velcro strips about 12 inches long each, and a one-eighth inch adhesive foam pad.

The pad should allow mobility of the ankle, cover both the medial and lateral aspects of the lower leg (remember most blows will occur medially), and extend up the lower one-third of the involved leg.

Construction begins by measuring the above mentioned areas and cutting a piece of Orthoplast to size (Figure 1) The material is then placed into hot water (use a hydrocollator if one is available) allowing it to be formed to the desired shape conforming to the leg. The bottom can be

Figure 1

Figure 2

Figure 3

Figure 4

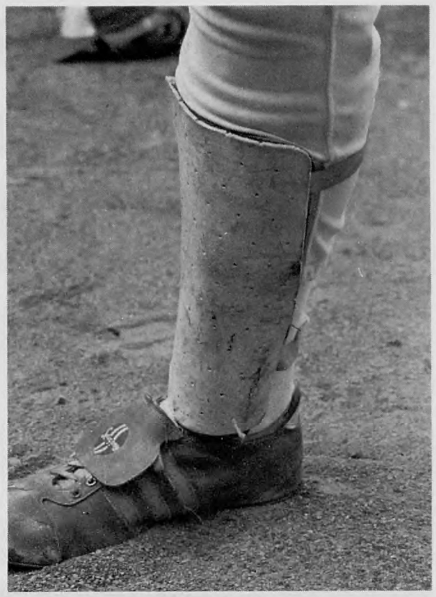

Figure 5

shaped into a semi-lunar fashion for better mobility. Trim away additional excess. After this is done, allow to harden. Finally, secure the velcro strips one high, one low by using the adhesive foam padding. Moleskin can be used at both ends of the pad if friction is encountered (Figure 2).

The batter can now wear the pad over the uniform removing it when reaching base. The pad should not hinder the running of the wearer (Figures 3,4,5).

While it wouldn't be practical for all players to wear this protective device, those who are prone to encounter this problem will find it very effective. +

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Flashbacks in NATA History

Chris Neuman
Kansas State University

In 1926, Jay Colville, presently athletic trainer emeritus at Miami University of Ohio, prepared a term paper for physiology Professor Stephen Riggs Williams at Miami entitled "Athletic Injuries and Emergencies." As I first approached Jay's essay, I was prepared to discover and bring out all the great changes that have taken place over the last 55 years in athletic training. However, as I read through the paper I began to realize that that approach was going to be impossible to pursue.

Jay began his paper by dividing athletic training into three categories: Conditioning, Specialized Training and the Treatment of Injuries, with the last division, as Jay recalls, falling "under the scope of the trainer's work." Jay describes a trainer as the following, "... a 'go-between' for a specialized doctor and a team coach."

Jay reviews some conditions seen frequently by trainers including fractures, dislocations and sprains. His fracture discussion included the types of fractures, evaluation of a fracture, and immobilization techniques. Dislocations and sprains were also defined with a short discussion on reducing dislocations and a detailed description of treatment for sprains. Under treatment of sprains Jay made the following statement, "The treatment consists so far as possible in keeping the swelling out, or if it has already occurred, in hastening its removal."

Throughout the paper there were many "current" concepts and I picked up a few new tips. However, Jay really makes the basic statements about athletic training which are true today in the very beginning of his paper when he says:

> To begin with we ask, just what is meant by athletic "training"? It is to put the body with extreme and exceptional care under the influence of all the agents which promote its health and strength in order to enable it to meet extreme and exceptional demands upon it.
>
> Training has evolved into a science which requires a thorough understanding of the human body, its structure, its functions, and its methods of adaptation to newly-created conditions.

Although I began Jay's article expecting to find vast differences and changes in athletic training from 1926 to today, I instead discovered ideas and values which have been and still are cornerstones in our field. Special thanks to Jay Colville for the reminder that despite the new approaches to sports medicine there are many important lessons learned years ago which are still valuable and vital to athletic training today. +

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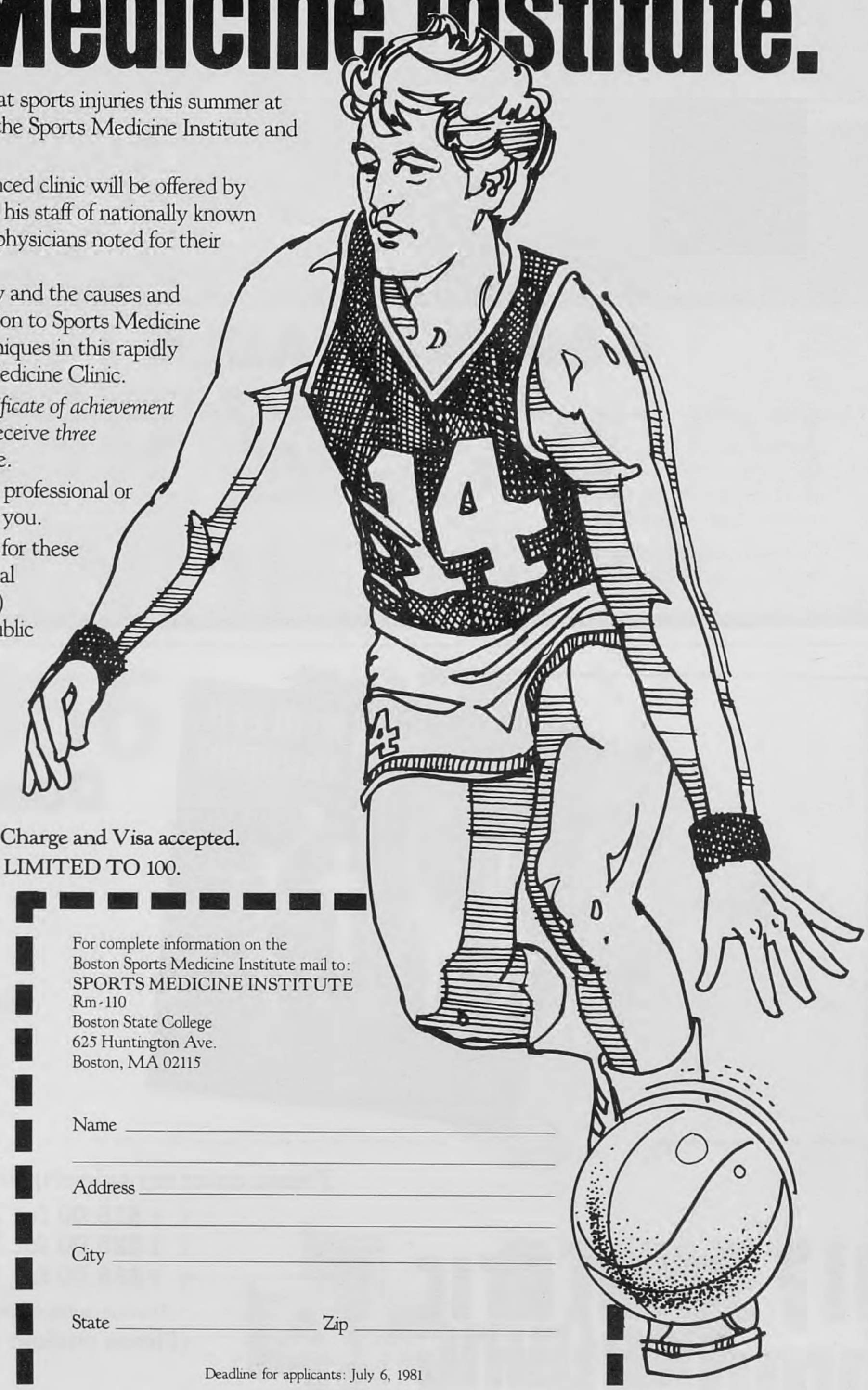

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Anatomy and Biomechanics of the Ankle and Foot

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Edited by: Don Kaverman, ATC

Ankle

The bony configuration of the ankle renders at a hinge joint of the mortise and tenon variety. It therefore enjoys freedom in only one plane, that of flexion and extension, commonly expressed as dorsiflexion and plantar flexion. The axis of motion of the ankle joint passes transversely through the medial and lateral malleoli (Fig. 8). The position of reference with respect to motion occurs when the sole of the foot is perpendicular to the axis of the lower leg. Allowing for individual variations, the range of dorsiflexion is 20° to 50° (Fig. 1).

The ankle joint is formed by the articulation of the talus with the distal tibia and fibula, the latter elements forming, in essence, a single structure. The portion of the talus forming the ankle joint has three articular surfaces. The *superior*, or trochlear surface, wider in front than in back, is depressed centrally by a longitudinal groove, and articulates with the tibial plafond. The *medial* surface articulates with the facet on the inner side of the medial malleolus and the *lateral* surface articulates with the inner or medial side of the distal fibula. It is of anatomic and clinical significance that the lateral malleolus is larger than the medial, it extends further distally along the body of the talus, and approximately 20° posterior to the coronal or frontal plane (Fig. 2).

The fact that 85% of all ankle ligament injuries involve the lateral side is partly explained by the increased length of the lateral malleolus. It tends to form an effective bulwark, preventing excessive lateral displacement of the talus, and thus guarding the ligaments of the medial side. The ligaments of the lateral side are, from front to back, the anterior talofibular, calcaneal fibular and posterior talofibular. The medial side of the ankle is protected by the deltoid ligament, a broad, strong structure which fans out from the medial malleolus to attach anteriorly to the tuberosity of the navicular, spring ligament and neck of the talus. It is directed inferiorly to the sustentaculum tali of the calcaneus and posteriorly to the body of the talus. The mid portion consists of a deep and superficial layer. Through its attachment to the spring ligament, it assists in supporting the head of the talus, and thus the longitudinal arch of the foot. The distal tibia and fibula forming the ankle mortise are bound by three structures: the anterior and posterior tibiofibular ligaments, or interosseous ligament (Figs. 3, 4).

Foot

The foot is a mechanism designed to transfer weight from the leg to the ground. The elastic components of the longitudinal arch help dissipate the forces of the ground reaction of body weight, and thus decrease stresses on the lower extremities incidental to walking and running.

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From an anatomic standpoint, the foot is considered in three parts: the hindfoot, consisting of the calcaneus and talus; the midfoot, comprised of the navicular, cuboid and three cuneiforms; and the forefoot, formed by the metatarsals and phalanges. Injuries to each part are rather distinctive. The hindfoot is usually injured as the result of a vertical load exerted by the superincumbent weight of the body, producing a compression injury. The midfoot permits lateral motion and circumduction, and injury here results from forcing these bones through a range of motion beyond their capacity. This results in avulsion type injuries to either the bone or attached ligaments. The long bones of the forefoot are injured in a manner similar to long bone injuries elsewhere in the body.

The talocalcaneal and talonavicular joints permit lateral motion and circumduction. Minimal motion is permitted by the remaining joints.

The arch span of the plantar ligament is supported posteriorly by the calcaneus and anteriorly by the metatarsal heads. The lateral aspect of the arch rests on the ground, giving additional support to the foot. The plantar ligament is supported by the intrinsic muscles and ligaments of the foot, and its structure is thus maintained by the bony architecture, ligaments and muscle.

The weight bearing or plantar surface of the foot is covered by thick skin, firmly connected to the deep fascia via strong fibrous bands. This skin, unlike the skin on the dorsum of the foot, does not slide back and forth, and grants firm purchase to the ground. The fat pad of the heel, compartmentalized by dense fibrous septi passing from skin to deep fascia, serves as an efficient hydraulic shock absorber.

Motion of the foot occurs as a composite of movements at various joints. In addition to pure flexion and extension occurring at the ankle joint, the foot may move about the vertical axis of the leg, and about its own horizontal and longitudinal axes. The movements of abduction/adduction occur about the vertical axis Y. Simply stated, adduction is defined by movements resulting in the tips of the toes facing inward, and abduction by the tips of the toes pointing outward. Approximately 35° to 45° of adduction/abduction is possible. The movements of supination/pronation are produced when the foot rotates around its longitudinal axis Z, such that the foot faces medially (supination) or laterally (pronation). The range of supination (50°) is greater than that of pronation (25° to 30°). Actually these are not simple movements, and each is accompanied by movements in two other planes. Adduction is accompanied by supination, and slight plantar flexion, and the resulting posture is termed inversion. Abduction is accompanied by pronation and dorsiflexion, producing eversion.

Subtalar joint: The subtalar joint is formed by the articulation of the inferior surface of the talus with the os calcis. This articulation occurs at two separate surfaces or facets (Fig. 5), each united by ligaments and a joint capsule. The main ligament is the interosseous talocalcanea ligament consisting of anterior and posterior fibrous bands occupying the sinus tarsi. It is of prime importance in maintaining the stability of the subtalar joint. Movement of the calcaneus beneath the talus occurs simultaneously in three planes, the foot to adapt the extremity to incongruent and unlevel walking surfaces.

Intercuneiform and tarsometatarsal joints (Fig. 6). The intercuneiform joints allow a slight vertical motion which alters the shape of the transverse plantar arch of the foot. Tarsometatarsal motion results in changes in the shape of the anterior arch. Depression of the first metatarsal represents a composite of flexion and abduction, while the fifth metatarsal moves concomitantly in flexion and adduction. The result is a deepening or increased curvature of the anterior arch. Conversely, metatarsal elevation is accompanied by the opposite motion of abduction and adduction at the corresponding metatarsals, resulting in a flattening of the anterior arch (Fig. 7)

Muscles of the Ankle and Foot

Muscles of the ankle and foot are either dorsiflexors or plantar flexors of the ankle, depending on the point of insertion relative to the transverse axis of the ankle. These muscles inserting anterior to the transverse axis produce dorsiflexion; those inserting posterior, plantar flexion. In addition, the dorsiflexors inserting medial to the longitudinal axis of the foot produce simultaneous adduction and supination (inversion), while those inserting laterally produce simultaneous abduction and pronation (eversion).

The ankle dorsiflexors, from medial to lateral, are the

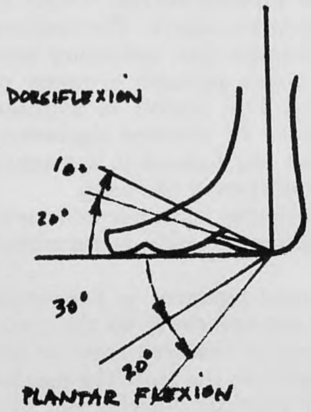
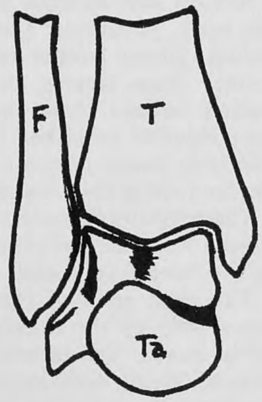


FIGURE 1



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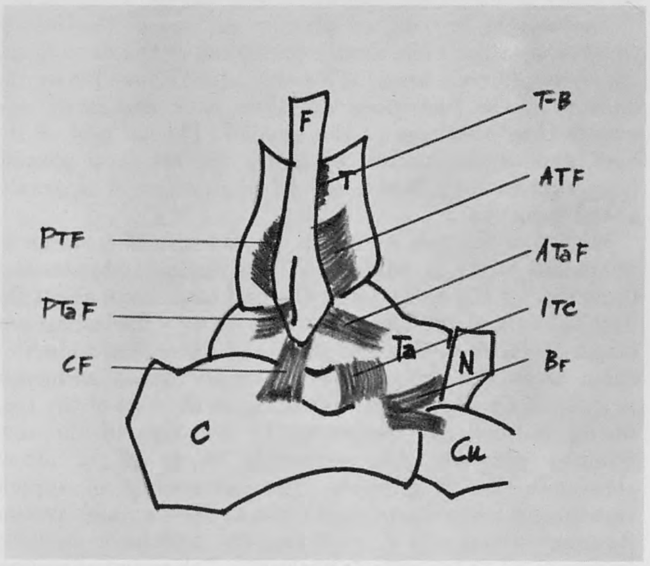

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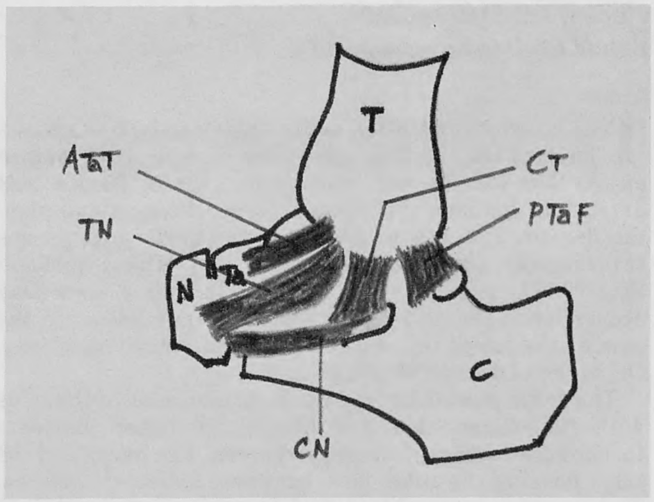

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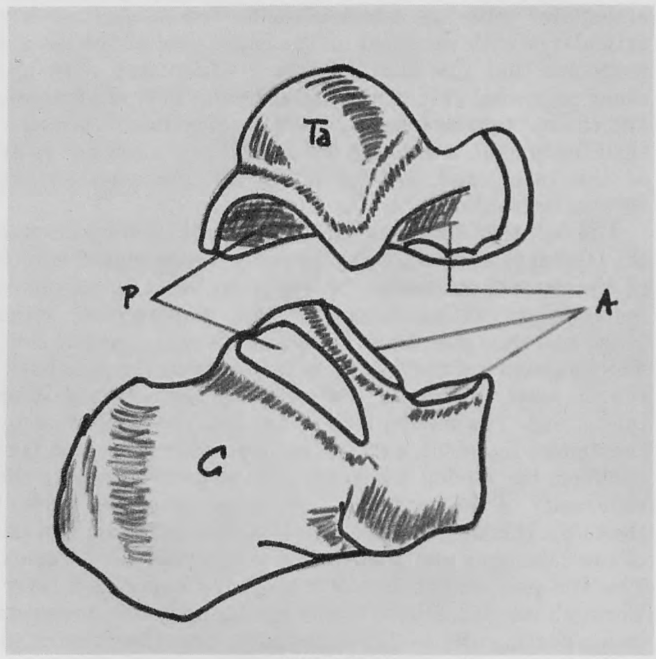


FIGURE 5

Figure 1. Range of motion, ankle joint. Note 10° individual variation in dorsiflexion (20°-30° range), and 20° variation in plantar flexion (30°-50° range). (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb. Ed. 2, Edinburgh, 1970, Churchill Livingston)

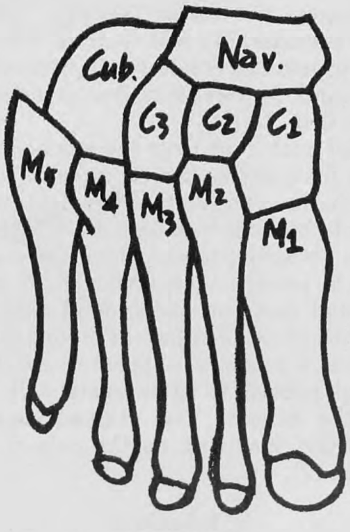
Figure 2. The bony ankle joint. F = fibula; T = tibia, Ta = talus. (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb, Ed. 2, Edinburgh, 1970, Churchill Livingston)

Figure 3. Ligaments of the lateral side of the ankle and distal tibia and fibula. F = fibula; T = tibia, Ta = talus; N = navicular; Cu = cuboid; C = calcaneus; T-B = tibiofibular interosseous ligament (syndesmosis); ATF = anterior tibiofibular ligament; PTF = posterior tibiofibular ligament; ATaF = anterior talofibular ligament; PTaF = posterior talofibular ligament; ITC = interosseous talocalcaneal ligament; BF = bifurcated ligament; CF = calcaneofibular ligament (Modified from DiStafano, V.: The Sprained Ankle. Schering Corporation Sports Medicine Information Series)

Figure 4. Ligaments of the medial side of the ankle. T = tibia; Ta = talus; N = navicular; C = calcaneus. Components of the deltoid ligament: ATaT = anterior talotibial ligament; tibionavicular ligament; CT = calcaneotibial ligament; CN = calcaneonavicular (spring) ligament. (Modified from DiStefano, V.: The Sprained Ankle. Schering Corporation Sports Medicine Information Series)

tibialis anterior, extensor hallucis longus, extensor digitorum longus and peroneus tertius. The greater the distance of tendon insertion from the axis of motion, the greater the lever arm of torque and force applied. An example is the tibialis anterior, which inserts from the longitudinal axis of the lower leg than the extensor hallucis longus, and therefore, a more powerful adductor and supinator (Figs. 8, 10, 11).

The triceps surae (gastrocnemius and soleus; gastrosoleus) muscle (Fig. 9), is by far the most powerful ankle plantar flexor of the foot. As the name implies, this muscle consists of three heads. The medial and lateral heads of the gastrocnemius arise from the distal posterior surfaces of the medial and lateral femoral condyles. The flatter soleus muscle lies deep to the gastrocnemii and originates from the proximal tibia, fibula and interosseous membrane. Distally, the three heads are transformed into the Achilles tendon, which inserts into the posterior aspect of the os calcis. The mechanical efficiency of the gastrocnemius is closely related to the degree of knee flexion. Thus with the knee in extension, the gastrocnemius is passively stretched, and works at a greater mechanical advantage. It becomes increasingly weakened with progressive knee flexion. The action of the soleus, which



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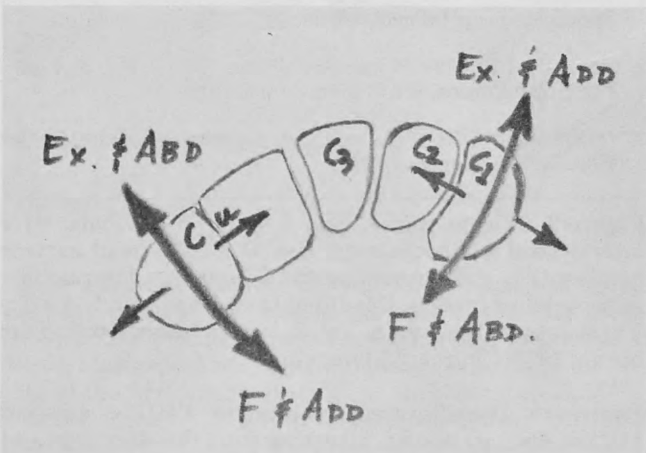

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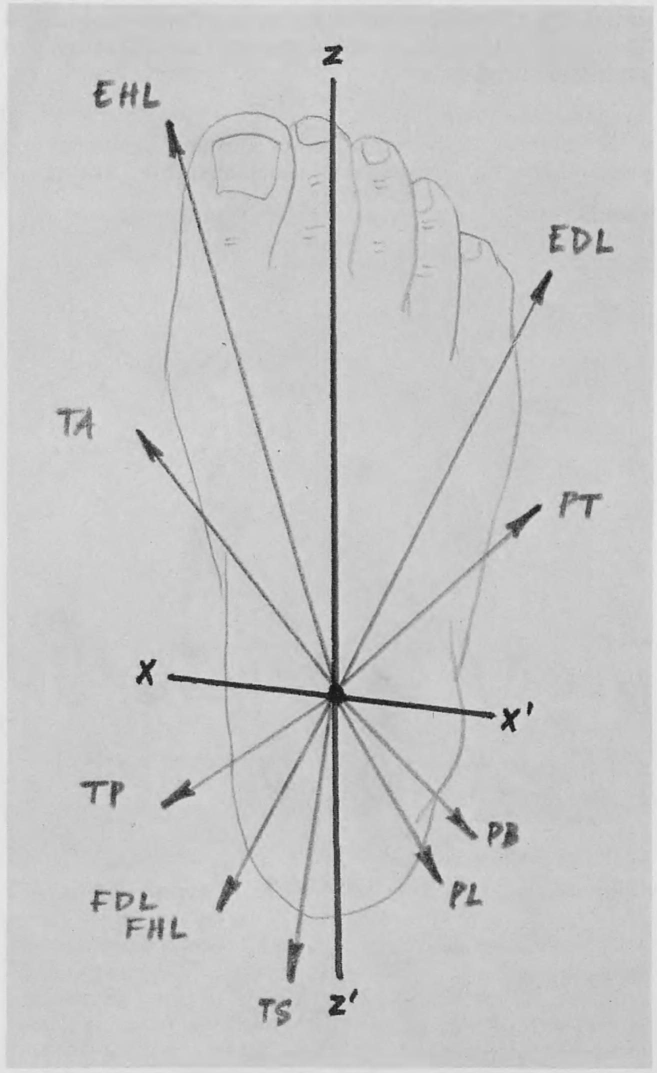


FIGURE 8

Figure 5. Subtalar Joint. Ta = Talus; C = calcaneus (os calcis); P = posterior articulation; A = anterior articulation (calcaneal articulation shown as two separate facets). (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb. Ed. 2, Edinburgh, 1970, Churchill Livingston)

Figure 6. Intertarsal and tarsometatarsal joints. Cub = cuboid; Nav = navicular; C3 = third (lateral) cuneiform; C2 = second (intermediate) cuneiform; C1 = first (medial) cuneiform; M1-5 :metatarsals, one through five. (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb. Ed. 2, Edinburgh, 1970, Churchill Livingston)

Figure 7. Changes in the transverse arch with motion. Seen from the tarsal side of the tarsometatarsal joints. Cu = cuboid; C3, C2, C1 = cuneiforms; Ex + Add = extension and adduction; F + Add = flexion and adduction; F + Abd = flexion and abduction. (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb. Ed. 2, Edinburgh, 1970, Churchill Livingston)

Figure 8. Motors of the Foot. X-X′ = transverse axis (ankle joint); 2-2″ longitudinal axis of the foot; TA = tibialis anterior; EHL = extensor hallucis longus; EDL = extensor digitorum longus; PT = peroneus tertius; TP = tibialis posterior; FDL = flexor digitorum longus; FHL = flexor hallucis longus; TS = triceps surae; PL = peroneus longus; PB = peroneus brevis. (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb. Ed. 2, Edinburgh, 1970, Churchill Livingston)

originates below the knee joint, is independent of the position of the knee. The triceps surae is maximally effective when contracting with the knee extended and dorsiflexed, as in the start of a sprint. The triceps acts on the ankle through the subtalar joint: having produced plantar flexion of the ankle that tilts the calcaneus inward, plantar flexion is accompanied by some elements of adduction and supination.

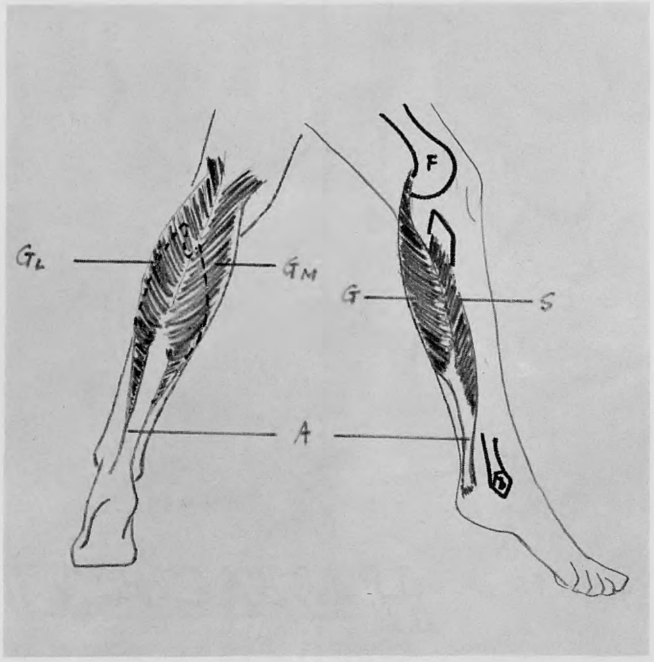
Five other muscles also produce plantar flexion of the ankle, but their combined force is only 7% of the force exerted by the triceps surae. The muscles which lie lateral to the long axis, the peroneus longus and brevis (Fig. 12), produce elements of abduction and pronation. The medial group, the tibialis posterior, flexor digitorum longus and flexor hallucis longus, produce concomitant adduction and supination (Fig. 10, 13).

Arches of the Foot

The plantar vault, comprised of muscles, ligaments and joints of the foot, is an elastic shock absorbing system. It is capable of changing its curvature in adaptation to unevenness of ground. Supported by three arches, the anterior, lateral and medial, it rests on the ground at three points: the heads of the first and fifth metatarsals and the tubercles of the os calcis (Fig. 14). The medial arch is comprised of five bones, with the tarsal navicular functioning as the keystone. Its concavity is maintained by ligaments uniting the bones and acting as static supporters, the most significant being the plantar calcaneal navicular and talocalcaneal. Muscles also dynamically via their tendons to reinforce or tighten the arch. The zenith of the bony arch is located in the navicular, 15 to 18 mm. above the ground (Fig. 15).

The lateral arch, in contrast to the medial, consists of only three bones, two major tendons, and an intrinsic muscle. It is considerably less flexible, and its keystone, the anterior process of the os calcis, sits only 3 to 5 mm. above the ground. Its rigidity is due to the strength of the long ligament (Fig. 16).

The anterior arch runs from the head of the first metatarsal to the fifth metatarsal. It is relatively flat and is spanned by the intermetatarsal ligaments and the transverse head of the adductor hallucis muscle. This transverse arch is actually present along the entire length of the foot. At the level of the cuneiforms, it is comprised of four bones, and rests on the ground only at its lateral extremity, the cuboid. The peroneus longus subtends this arc, and acts as a powerful supporter. At the level of the navicular and cuboid, it again rests only at its lateral extremity, the cuboid. The plantar extension of the tibialis posterior, inserting on the cuboid, maintains its integrity (Fig. 17). +



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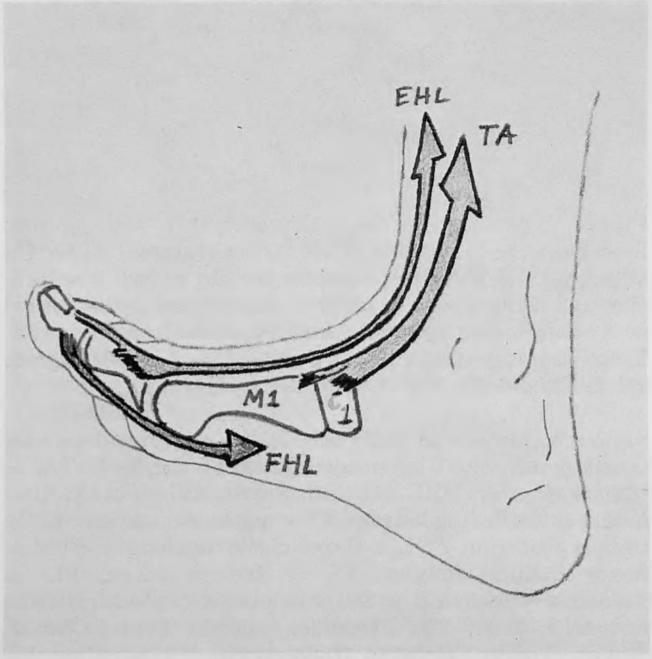

FIGURE 10

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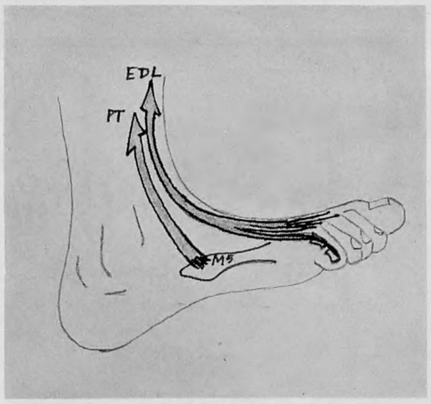
3. O'Donoghue DH: *Treatment of Injuries to Athletes.* 3rd Edition, WB Saunders, 1976.

Figure 9. Triceps Surae. F = femur; Fb = fibula; Gl = lateral head gastrocnemius; Gm = medial head gastrocnemius; G = gastrocnemius and S = soleus, lateral view; A = Achilles tendon. (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb. Ed. 2, Edinburgh, 1970, Churchill Livingston)

Figure 10. Dorsiflexors of the ankle. EHL = extensor hallucis longus, shown inserting into the dorsal aspect, base of the distal phalanx. TA = tibialis anterior inserting into the medial side, dorsal aspect, first (middle) cuneiform and base of the first metatarsal; M1 = first metatarsal; C1 = first (medial) cuneiform. Also shown is FHL = flexor hallucis longus (not a dorsiflexor) inserting into the base of the plantar aspect of the distal first phalanx. (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb. Ed. 2, Edinburgh, 1970, Churchill Livingston)

Figure 11. Dorsiflexors of the ankle. PT = peroneus tertius inserting into the medial aspect of the base of the fifth metatarsal; EDL = extensor digitorum longus seen inserting into the medial aspect of the base of the fifth metatarsal; EDL = extensor digitorum longus seen inserting into the dorsal aspect of the distal and middle phalanges of the fifth toe (actually inserts into the four lateral toes in an identical manner); M5 = fifth metatarsal. (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb, Ed. 2, Edinburgh, 1970, Churchill Livingston)



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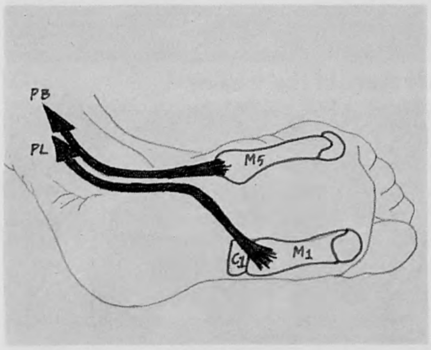

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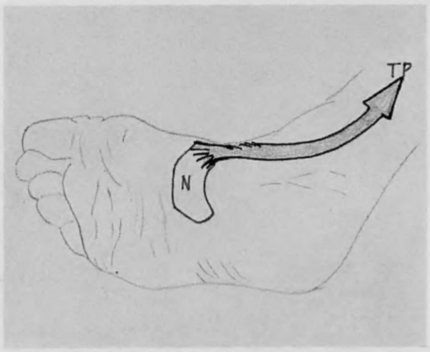

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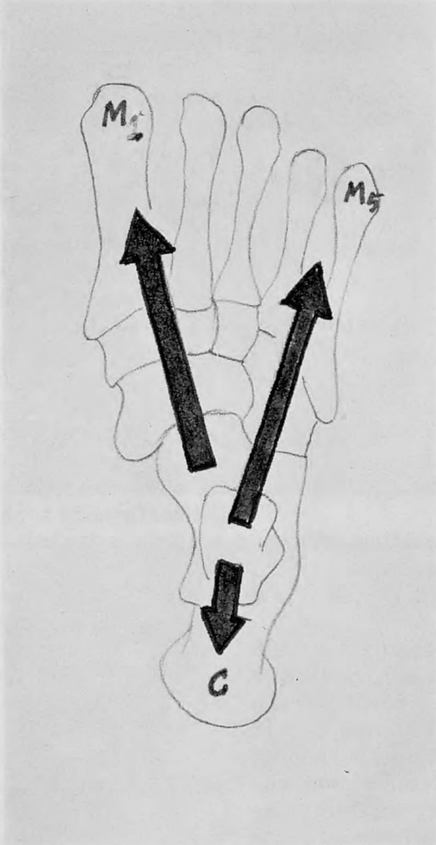

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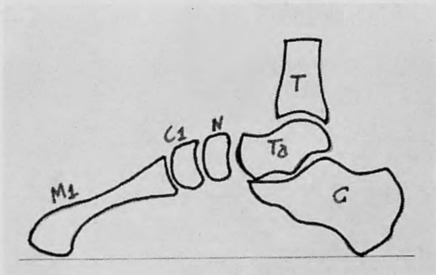

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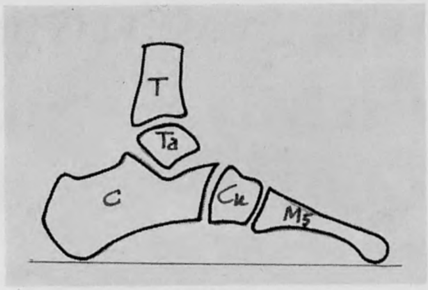

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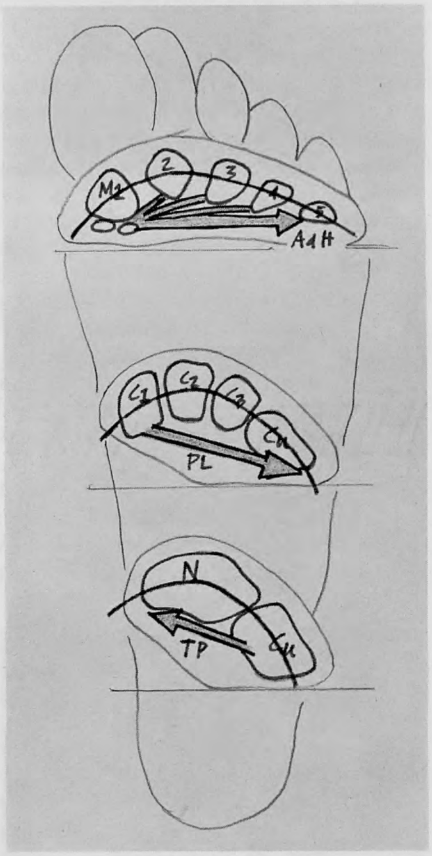


FIGURE 17

Figure 12. Ankle plantar flexors. PB = peroneus brevis inserting into the tubercle of the base of the fifth metatarsal; PL = peroneus longus inserting into the lateral of the plantar aspect of the first (medial) cuneiform and the base of the first metatarsal; M5 = fifth metatarsal, M1 = first metatarsal; C1 = first (medial cuneiform). (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb, Ed. 2, Edinburgh, 1970, Churchill Livingston)

Figure 13. Ankle Plantar Flexors. TP = tibialis posterior; main insertion into the tuberosity of the navicular is shown. Actually sends extensions into all the tarsal bones with the exception of the talus. N = tarsal navicular. (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb, Ed. 2, Edinburgh, 1970, Churchill Livingston)

Figure 14. Support points of the arches of the foot. M1 = head of the first metatarsal resting on the medial and lateral sesamoid bones (latter not shown); M5 = head of the fifth metatarsal; C = tubercles of the calcaneus (os calcis). (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb, Ed. 2. Edinburgh, 1970, Churchill Livingston)

Figure 15. Bones of the medial arch. M1 = first metatarsal — in contact with the ground only by its head via the sesamoid bones; C1 = first (medial) cuneiform — clear of the ground; N = tarsal navicular which is the keystone of the arch lying 15-18 mm. above the ground; Ta = talus, which receives all the forces transmitted by the leg and transfers them to the vault; C = calcaneus (os calcis) which is in contact with the ground only at its posterior extent via its medial and lateral tubercles; T = tibia. (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 1, Lower Limb, Ed. 2, Edinburgh, 1970, Churchill Livingston)

Figure 16. Bones of the lateral arch. M5 = fifth metatarsal in contact with the ground via its head; Cu = cuboid, clear of the ground; C = calcaneus (os calcis) forming the posterior support of the arch; Ta = talus; T = tibia. (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb. Ed. 2, Edinburgh, 1970, Churchill Livingston)

Figure 17. Anterior-transverse arch. M1, 2-5 = metatarsals #1-5, note sesamoids beneath M1; AdH = adductor hallucis, transverse head; C1-3 = cuneiforms; Cu = cuboid; PL = peroneus longus; N = navicular; Cu = cuboid; TP = tibialis posterior. (Modified from Kapandji, L.A.: The Physiology of the Joints, Vol. 2, Lower Limb, Ed. 2, Edinburgh, 1970, Churchill Livingston)

Airway Maintenance — A Primary Consideration in the Unconscious Athlete

Steve Moore, ATC, EMT

The primary consideration in an unconscious person is maintenance of an open (patent) airway. Hopefully, athletic trainers have had this axiom repeated enough so that it has been permanently etched into their minds.

The tongue of a supine unconscious person acts as a natural occluder to the airway, since it falls back into the pharynx and obstructs the tracheal opening. (Figures 1 and 2.)

To maintain the airway of a supine unconscious athlete, the trainer has two methods from which to choose:

1. Hyperextension of the head and neck; i.e., the "jaw jutted" position, as shown in Figure 3.
2. The jaw thrust maneuver, shown in Figure 4, should be utilized if any suspicion of cervical fracture is present. To perform it, the trainer should put the fingers under the angles of the Jaw and should gently lift upward, while at the same time keeping the mouth open by hooking his thumbs over the front teeth of the lower jaw. Before inserting the thumbs into the mouth, it is advisable to insert a jaw spreader or epistick between the molars (Figures 5 and 6), since the jaw muscles may spasm if the athlete convulses.

Following either method of opening the airway, the oropharyngeal airway may be inserted to afford a "guaranteed" open airway, allowing the trainer to discontinue physical efforts to maintain the same. The trainer must remember that any type airway can be inserted only in a completely unconscious person, as it will stimulate the gag reflex in a semiconscious person.

Oropharyngeal airways should be purchased in disposable sets containing various sizes, ranging from an infant size to an adult size (Figure 7). Note the airway curvature conforming to the curvature of the tongue.

In order to insert the oropharyngeal airway, the trainer must consider the following steps:

1. If the unconscious athlete is wearing a helmet with a face or cage or mask, the cage or mask will have to be removed in order to gain access to the mouth. The helmet itself should not be removed.
2. The proper size airway must be selected. Through the process of trial and error, select the airway that appears to be the right size. Do this by laying the airway on either cheek between the ear lobe and the corner of the mouth. The ends should match these two anatomical landmarks as shown in Figure 8. If the airway is too short, select the next size larger. Conversely, if it is too long, select the next size shorter.

FIGURE 1

FIGURE 2

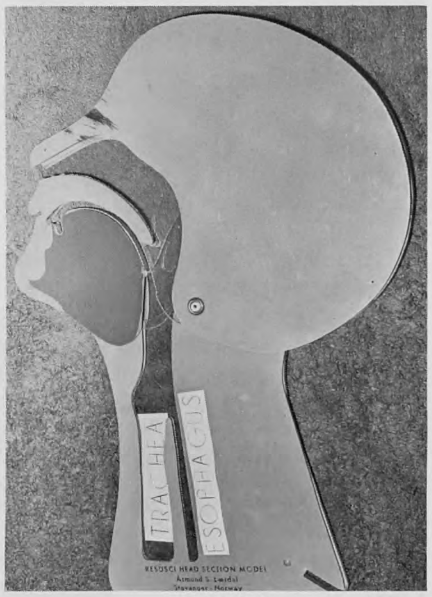


FIGURE 3

Figure 1. The tongue is held forward by voluntary muscles in the conscious person.

Figure 2. The tongue falls backward to occlude the airway of an unconscious person, since voluntary muscles are relaxed.

Figure 3. In the jaw-jutted position, the tongue is no longer occluding the airway.

Figure 4. The jaw thrust maneuver to open the airway.

Figure 5. Illustration of the jaw spreader and the epistick.

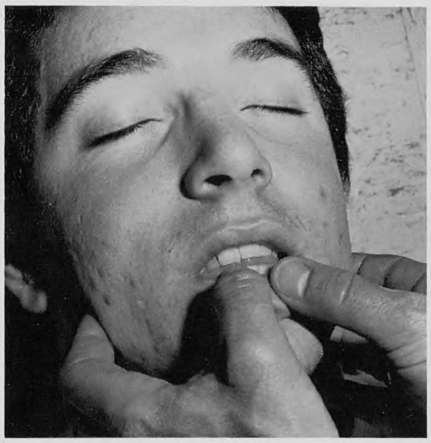
Figure 6. The proper method of inserting the jaw spreader.

Figure 7. Sizing of the oropharyngeal airways.

Figure 8. Proper method of measuring the oropharyngeal airway for size.

Figure 9. Showing the crossed finger technique for opening the mouth prior to insertion of the airway.

Mr. Moore is presently the head athletic trainer at Tennessee Tech University in Cookeville, Tennessee 38501.



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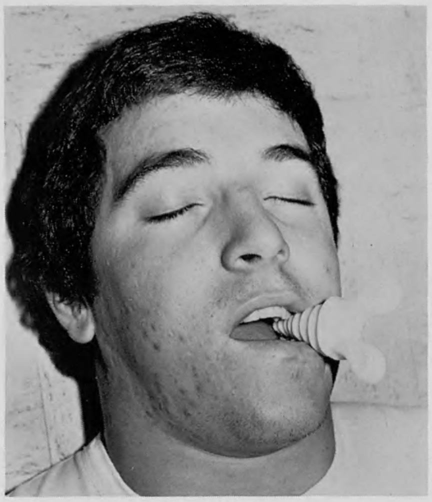

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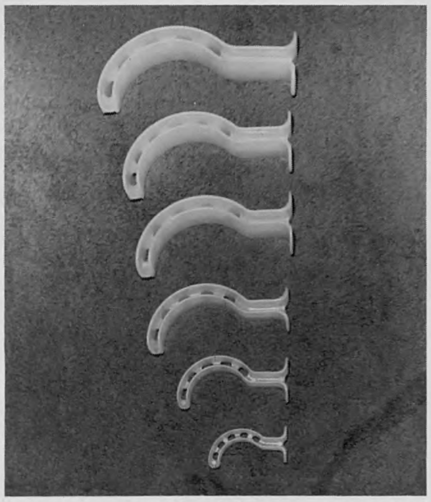

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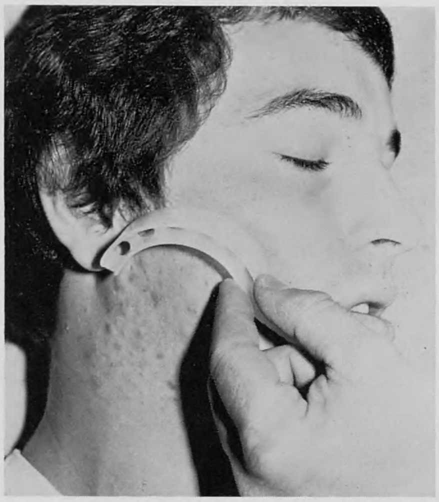

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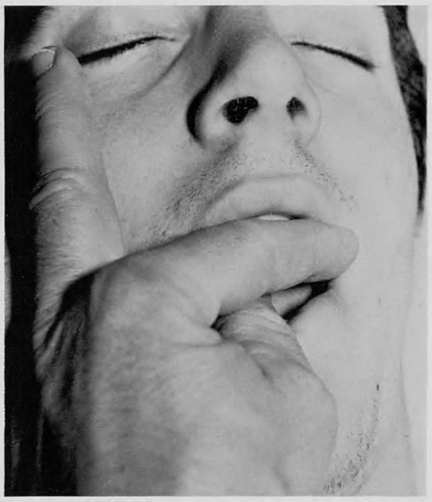
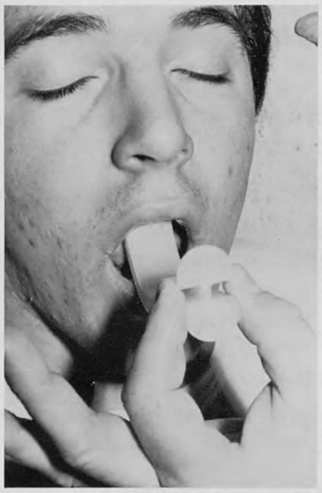


FIGURE 9

3. As previously discussed, the jaw thrust maneuver should be performed to lift the tongue from the pharynx. Hyperextension of the neck is generally thought to be dangerous since a neck injury must be suspected in conjunction with a head injury.
4. To insert the airway, open the mouth using the crossed finger technique (Figure 9) for leverage. Insert the properly measured airway UPSIDE DOWN, that is, with the concave aspect facing the roof of the mouth (Figure 10) until resistance is felt. At this point, turn the airway 180 degrees until the concave aspect fits the curvature of the tongue. As the airway is flipped through 180 degrees, the trainer will feel it fall into place. To be properly placed the airway flange should lie exactly against the lips (Figure 11).



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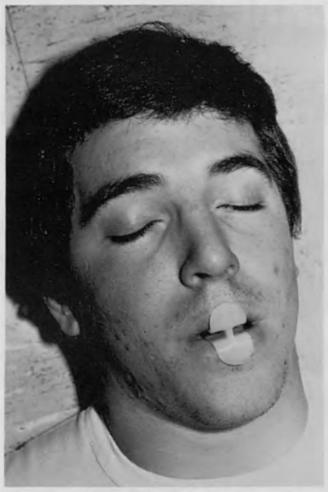

FIGURE 11

Figure 10. Proper initial insertion of the airway with the concave aspect of the device facing the roof of the mouth.

Figure 11. Showing proper placement of the completely inserted airway.

If the athlete with such an airway in place begins to gag, the device should be removed promptly lest vomiting be induced. In this instance, resorting to the jaw thrust maneuver until the athlete is fully conscious and able to effect his own airway would be appropriate.

Anytime the airway is in place, monitoring of the rate of respiration and the carotid pulse is mandatory. If the athlete should go into respiratory arrest, begin mouth-to-mouth breathing. If cardiac arrest should occur, begin CPR immediately.

It must be emphasized that a check of local statutes and ordinances should be made prior to purchasing a set of oropharyngeal airways. Training as an EMT is a requirement for their use in some states. It also is advisable to check with the team physician to gain approval for its use.+

Editor's Note: Anyone wishing to have an idea, technique, etc. considered for this section should send one copy to **Ken Wolfert, Miami University, Oxford, Ohio 45056.** *Copy should be typewritten, brief, and concise, using high quality illustrations and/or black and white glossy prints.*

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tracting ground which prevents any type of motion other than that which occurs on the frontal plane. Therefore, the foot is dependent upon the subtalar joint which allows for transverse plane rotation to be absorbed in the foot by either eversion or inversion of the calcaneus, that is, pronation or supination of the subtalar joint.

Midstance, or foot flat, is the next forty percent of stance phase. The lower extremity now externally rotates and the subtalar joint re-supinates.(7,17,18) The foot now becomes a rigid lever in preparation for the propulsion phase. It is during this phase that lack of resupination, or excess pronation, that varieties of problems, such as overuse syndromes, can occur. Problems from excess pronation will be discussed later.

The third phase is the propulsion (toe off) phase which is the remaining thirty-five percent of the stance phase. The leg remains externally rotated and the foot continues in supination.

Clinical Complications

With prolonged pronation, the foot stays hypermobile(2,6,8) and low back pain, hip pain, knee pain, and foot and ankle pain may result. In other words, what happens at one end of the closed kinetic chain (the foot) can effect the rest of the chain (knee, hip and back) or vice versa.

Bates(1) stated that if internal tibial rotation is increased and prolonged with excessive pronation, the greater transverse rotation must be absorbed in the knee joint. The normal tibio-femoral rotation relationship is quite likely to be disturbed and may well account for much of the high incidence of knee problems in runners. Hlavac(9) pointed out that with an increase in pronation, there is an increase in rotation of the entire lower extremity, which causes an increase in the anterior pelvic tilt. This can cause an increase in low back pain due to the pull on the sciatic nerve, or a sprain to the ilio-lumbar ligaments. As pointed out above, with excess pronation there is an excess amount of internal rotation of the entire lower extremity. This added stress to the lateral side of the hip capsule could result in hip pain.

Kapandji(12) and Cailliet(3) discussed other possible problems due to excessive pronation. These problems involve the tibialis anterior, tibialis posterior and flexor digitorum longus, muscles which are most commonly involved in the "shin splint syndrome."(9,15) Slocum(16) agreed that excess pronation is a major cause of shin splints in which the tibialis posterior is most commonly involved. After heel strike, the anterior tibial group of muscles absorb the initial shock of weight bearing and provides for a smooth descent of the foot to the ground with an eccentric contraction. Inflammatory reaction to micro-traumas (IRMT) results, which causes pain to the anterior tibialis. The tibialis posterior and flexor digitorum longus can be involved with IRMT, too. With eccentric contraction of the anterior tibial muscle group there is prolonged dorsiflexion. The plantarflexors may be stretched beyond their normal range of motion which causes pain to these muscles.

A seventh complication is that the peroneal muscles must shorten to take up the slack due to excess pronation.(2) They, too, may then become painful and tender.

Gray(7) stated that prolonged pronation adds trauma to the non-contractile structures. Problems that may result are a strain to the transverse arch, sprain to the calcaneonavicular ligament or a stress fracture usually to the second metatarsal associated with a Morton's toe. The inflammation of the plantar fascia could also result. This

Pronated Foot Disorders

John Halbach, ATC, PT

In an athlete, there is one possible structural and biomechanical problem that can cause low back pain, hip pain, knee pain and foot pain: excess pronation of the foot. This paper will discuss five areas of excess pronation: anatomy and biomechanics, gait cycle, potential clinical problems, evaluation and rehabilitation.

Anatomy and Biomechanics

In pronation and supination, the subtalar joint and medial longitudinal arch are the main structures to consider. The talus and calcaneus make up the subtalar joint. (Fig. 1). The talus has additional importance as it is also the mechanical keystone at the apex of the foot.(2) The navicular bone, calcanonavicular ligament, long plantar ligament and plantar fascia are the main static stabilizers of the medial longitudinal arch.(6,12,14) (Fig. 2). The anterior tibialis and posterior tibialis are the dynamic supinators of the foot. In other words, they prevent pronation and are a key in rehabilitation for problems that stem from excess pronation. The peroneus longus and peroneus brevis are the main dynamic pronators of the foot. These two muscle groups, along with the abductor hallicus, make up the major dynamic components of the foot.(3) In general, contractile units are the dynamic stabilizers and non-contractile units the static stabilizers.(7) Further functional anatomy can be found in Cailliet(2), Gray(7) or Kapandji(12).

Biomechanically, pronation of the subtalar joint occurs with three other component motions: ankle dorsiflexion, calcaneal eversion, and forefoot abduction. Supination of the subtalar joint occurs with ankle plantarflexion, calcaneal inversion and forefoot adduction.(2,11,12) If any of these component motions are altered, then pronation and supination must be altered. For instance, with a decrease in forefoot abduction from a forefoot varus, excess pronation may be a compensatory movement. An increase in calcaneal eversion could be a result or a cause of excess pronation. Kapandji(12), Inman(11), and Root(16) are references for further information regarding biomechanics.

Gait Cycle

The gait cycle is divided into two major components: swing phase and stance phase(17). Since the majority of problems occur during the stance phase due to excessive pronation, swing phase will not be presented. The stance phase is divided into three phases(17). First is the contact (heel strike) phase, where the motion of the leg is internally rotating (close kinetic chain) and the subtalar joint quickly goes from supination to pronation. This first twenty-five percent of the stance phase is where the foot becomes a mobile adaptor due to pronation.(6,7,17) Pronation is normal during this first twenty-five percent of the stance phase for these three reasons.(18) One, the foot can adapt to a variety of terrain. Two, pronation reduces the shock of heel strike by locking and unlocking the joint of the ankle and foot. Three, pronation allows for transverse plane rotation to occur. Furthermore, Subotnick(18) indicates the foot must pronate because it cannot internally rotate due to the reactive forces of the contracting ground which prevents any type of motion other than that which occurs on the frontal plane. Therefore, the foot is dependent upon the subtalar joint which allows for transverse plane rotation to be absorbed in the foot by either eversion or inversion of the calcaneus, that is, pronation or supination of the subtalar joint.

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plantar fascia acts as a vertical tie-beam for support of the medial longitudinal arch. With excess pronation and especially with overweight athletes there is added trauma and pain results to the plantar fascia. The calcaneal tuberosity could also become painful since the plantar fascia attaches to it.

Finally, an overuse syndrome of the abductor hallicus is also possible. This is due to the continuous stretching and contraction in trying to maintain the medial longitudinal arch(2) of the foot.

Evaluation

The athletic trainer must be able to recognize pronated feet. With this recognition, he/she is able to get at the root of the problem. During the subjective exam, the following are some typical symptoms. The patients may reveal pain over the following locations: head of the second metatarsal, medial tubercle of the calcaneous, tendon of the posterior tibialis or anterior tibialis, posterior to the greater trocanter or lateral aspect of the knee joint(6,7). The athlete may also complain of tired foot and/or tired muscle groups, especially the dorsiflexors and evertors. Pain during non-activity generally indicates non-contractile and static components of the foot.(3) Pain during active movements indicates a dynamic or contractile unit involvement.(3) So during the subjective exam, ask what the behavior of the symptoms are.

During the objective exam, there are many signs that indicate excessive pronation. During general observation while standing, look for calcanal valgus; a hypertrophied abductor hallucis or claw toes. All could be indications of pronated feet.(8,12,13) Fiess' line can be used as an indication of the degree or severity of static pronation.(6) Fiess' line is a line from the head of the first metatarsal to the middle of the medial malleous. (Fig. 3) As the demarkation in the drawing shows, the degree of pronation can be determined by the location of the navicular tubercle within the designated area. If the navicular tubercle falls on Fiess' line the foot is normal. A first degree indicates a mildly pronated foot. A second degree indicates a moderately pronated foot. A third degree indicates a severely pronated foot. The second and third degree Fiess' line indicate more severe problems.

Hoppenfeld(10) illustrates some specific palpation points of the foot: (1) the first metatarsocuneiform joint; if hypermobile, it could be an indication of pronated feet;(6) (2) the navicular-tubercle; it could become painful with excess pronation, as it may press against the medial counter of the shoe and its insertion of the tibialis posterior; (3) head of the talus is also prominent with a pronated foot; (4) the sustentaculum tali as it serves as an insertion for the calcaneonavicular ligament; and (5) the plantar aponeurosis attachment to the medial tuberosity of the calcaneus and insertion near the heads of the metatarsal.

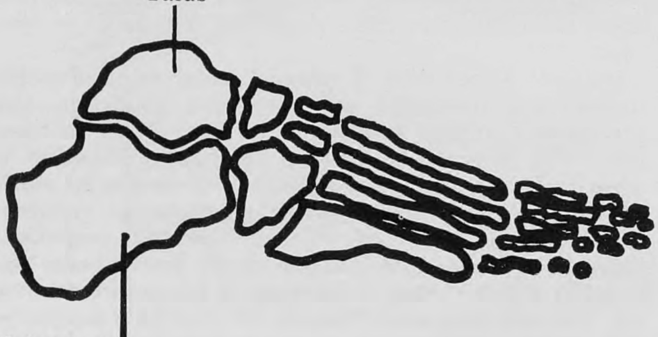

Figure 1: The subtalar joint, calcaneus and talus. Modified from Netter, F.H., *Traumatic Disorders of the Ankle and Foot,* CIBA Pharmaceutical Co., Summit, N.J., 1965, Page 4.

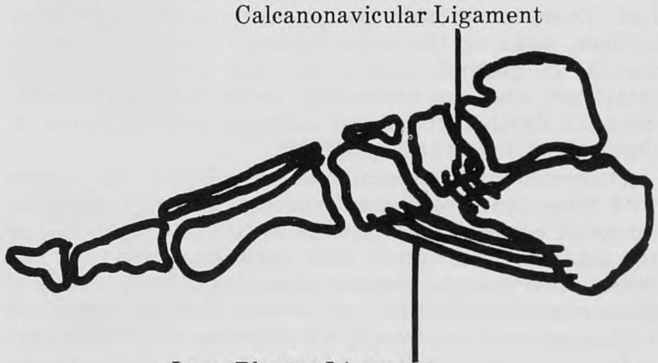

Figure 2: Static stabilizers of the medial longitudinal arch. Calcanonavicular ligament and long plantar ligament.

Modified from Netter, F.H., Traumatic Disorders of the Ankle and Foot, CIBA Pharmaceutical Co., Summit, N.J., 1965, Page 5.

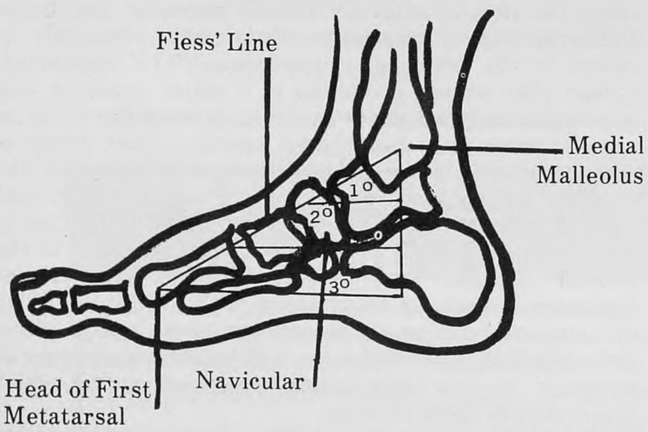

Figure 3:
1° Mildly static pronated foot
2° Moderately static pronated foot
3° Severely static pronated foot

Modified from Wallace, L., Introduction to Sports Medicine, the Press of Case Western Reserve University, Cleveland, OH 1975, Page 117.

Figure 4:

A. Normal weight bearing distribution
B. Mildly pronated weight bearing distribution
C. Moderately pronated weight bearing distribution
D. Severely pronated weight bearing distribution

Gait analysis is also a very effective tool in recognition of excess pronation. During the initial heel strike, look for an increase in calcanal valgus. During foot flat or toe off, check for a depressed medial longitudinal arch or a depressed navicular head. Another way to recognize excess pronation is with the use of a pedograph. This shows the weight distribution and stress points of the foot. (Fig. 4) This author has used the Harris mat test to show the weight-bearing pattern when performing biomechanical analyses and research on cross-country runners.

This author believes that pronation could be a result of an inadequate muscle imbalance of the dynamic components of the foot; resulting in a hypermobile foot. With the Cybex II Isokinetic Dynamometer, the ratio of inversion/eversion and dorsi/plantarflexion can be measured. Using a power protocol, Nelson(15) found the ratio of plantarflexion to dorsiflexion to be approximately three point five to one. Davies, et al(4) found it to be three point five to one for plantarflexion to dorsiflexion. He found the ratio of inversion to eversion to be approximately one point five to one with a strength protocol, and one point four to one for a power protocol. More research is indicated in this area before reliable ratios can be established.

Rehabilitation

To assist the static component of pronation, one can (1) build up the medial longitudinal arch with felt or Poly Cashion* (2) support this arch by taping and/or (3) wear shoes with a Thomas heel(3).

To control calcaneal valgus, a heel cup could be used. According to Bates(1), the waffle sole decreases the transverse rotational force up the lower extremity and may eliminate problems at the hip, knee or back. Erdman(6) recommends looking for running shoes with a heel of less than three inches, a long and wide heel contour for more calcaneal support and waffle sole bottoms.

Gray(8) states the rehabilitation should have emphasis on the muscular component since the dynamic component has the greatest dynamic support. Goals of the extrinsic dynamic components of the foot are to increase strength, power, and endurance of invertor/evertors and dorsi/plantarflexors.

Isotonic's progressive resistive exercises (PREs) using variations of DeLormes methods as well as isokinetics can be used to accomplish these goals. An example of a Cybex or Orthotron protocol of these exercises is 90/sec, 150/sec, 210/sec, 150/sec, and 90/sec., with ten to twelve repetitions at each set. One can also accomplish an isokinetic effect by placing a weight over the foot and exercising the limb under water.

To increase strength, power, and endurance of the intrinsic muscles of the foot, foot arching, marble picking with the toes and towel-gathering by the toes are beneficial.(7) Some functional activities that Erdman(6) advocates as therapeutic exercises are ice or roller skating, walking barefoot in sand and vertical jumping. If limited dorsiflexion is the cause of pronation, proprioceptive neuromuscular facilitation (PNF) hold-relax, contract-relax techniques can be used to increase range of motion.(7,19) Static standing on a wedge board may also accomplish this goal.

Finally, when should the athletic trainer refer an athlete to a podiatrist? Erdman(6) gives the following as suggestions for referrals: anyone with greater than six degrees of calcaneal valgus, an athlete with less than five degrees of dorsiflexion and who does not respond to a stretching program, a very rapid onset of "shin splints" especially with pinpoint pain, as there is a possibility of a stress fracture to the tibia or fibula, and anyone with three to six degrees of calcaneal valgus and who does not respond after two weeks of rehabilitation.

Summary

This article has presented an overview of the anatomy and biomechanics of the foot, the gait cycle, potential clinical problems, evaluation and rehabilitation of pronated feet. Finally, the pronated foot can cause a multitude of problems in athletics and result in missed practices, missed games, and even a missed season.

Acknowledgements

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*Rolyn Medical Products, Menomimee Falls, MI

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Aspirin and Athletics

Roxanne Caron, BS

Aspirin is one of the most widely used and misused drugs of today. Daily, advertisements go into great detail to describe how physicians recommend the use of aspirin for a multitude of conditions from tension headaches to rheumatoid arthritis. These ads perpetuate the overuse and abuse of this drug in an attempt to make consumers believe that aspirin is a panacea for all painful conditions. The athletic trainer is responsible for the well-being of the athletes in his care. It is important for him to understand the uses and side effects associated with aspirin as well as the other drugs which may be prescribed for the athletes by the team physician. Through the education of the athletes under his care the athletic trainer can help to prevent further misuse of aspirin. In order for the athletic trainer to fully understand this potent drug, it is necessary for him to understand the uses, actions, adverse reactions, oral kinetics, and drug interactions associated with aspirin therapy.

Uses

Aspirin exhibits anti-inflammatory, analgesic and antipyretic properties. Aspirin helps to reduce inflammation and fever and reduce pain. It is extremely useful in the treatment of bursitis, neuralgia, tendonitis and other painful conditions associated with the integumental system. Aspirin has also demonstrated moderate success "in the relief of post operative, post partum, and other visceral pain arising from trauma or cancer" ([1], pg. 344). Aspirin is the drug of choice in the treatment of rheumatoid arthritis ([11]) and has been successful in the treatment of a wide variety of conditions including mild leprosy reactions and trichinosis([1]). Recently, studies have shown that a daily dose of 650 mg., or two 5 grain tablets, of aspirin was beneficial in the reduction of heart attacks and strokes([4]).

Team physicians have prescribed aspirin for numerous painful inflammatory conditions such as tendonitis, bursitis, chondromalacia and tenosynovitis. Athletic trainers, under the direction of their team physicians, have often suggested the use of aspirin for the management of pain associated with sprains, strains and other painful conditions.

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Anti-inflammatory Actions

Aspirin's success in reducing inflammation has been linked to its inhibition of prostaglandin release([7]).

"Gastrointestinal bleeding occurs in approximately 70 percent of the people who take aspirin."

Prostaglandins stimulate the inflammatory process. When prostaglandin release is inhibited the result is a slowing down of the inflammatory process. Many researchers attribute aspirin's efficiency in the treatment of rheumatoid arthritis to its ability to inhibit prostaglandin release. The release of prostaglandins can be inhibited for up to three days after a single dose of aspirin. The exact effect of this prolonged inhibition is unknown at the present time. The inhibition of the prostaglandin release and the resulting decrease in the inflammatory process makes aspirin ideal for the treatment of conditions such as tendonitis and chondromalacia where inflammation is the major cause of the pain.

Adverse Reactions

There are numerous adverse reactions associated with the use of aspirin. The most significant problems occur in the gastrointestinal (GI) tract. Everything from "mild epigastric distress to severe hemorrhage and ulceration"([5], pg. 822) has been observed. The most common advese reactions are dyspepsia, nausea, vomiting and GI bleeding([1], [11]).

Aspirin is absorbed in the stomach as well as the small intestine([9]). The intracellular concentrations of aspirin in the mucosal cells of the stomach during the absorption process causes cellular damage which is reversible at low concentration levels. Basically, the surface cells are either damaged or destroyed. These cells are restored or replaced through the cellular repair mechanism. At high concentration levels, usuallyover an extended period of time, cellular damage of the stomach may be irreversible.

Noticeable gastrointestinal bleeding is associated with this mucosal damage. The amount of blood loss is directly proportional to the degree of cellular damage.

Gastrointestinal bleeding occurs in approximately 70 percent of the people who take aspirin. Personal conjecture by pharmacists and physicians surveyed by the author describe the percentage of people who develop some sort of GI bleeding to be as high as 90 percent in those people who use aspirin. Blood loss of up to six ml. per day has been recorded(1). This blood loss could lead to iron deficiency anemia with prolonged use of aspirin. The frequency and severity of this occult blood loss is dose related and is not affected by the intake of food(5). This means that aspirin taken with a meal will still cause gastrointestinal bleeding.

The gastrointestinal effects associated with aspirin can be minimized by the use of time releaed capsules or enteric coated tables(1). These compounds are not very reliable because their absorption is slow and, at times, erratic. Time released capsules dissolve slowly at normal body temperature, but they dissolve very quickly in the presence of hot liquids or a febrile condition. This means that the time release mechanism is destroyed and the full amount of the drug is released at once, causing the same gastrointestinal problems of regular aspirin.

Rectal suppositories completely avoid GI symptoms but absorption is very slow and incomplete(8), which makes suppositories impractical for use in athletics where the speed of the pain relief is important. Repeated use of suppositories can cause rectal irritation. The amount of aspirin, in suppository form, which can be absorbed is highly dependent upon retention time. A retention time of four to five hours results in about 60 percent of the aspirin being absorbed.

"Large doses of aspirin taken over an extended period of time may cause irreversible damage to the stomach mucosa."

Aspirin increases prothrombin time(14). Prothrombin is the precursor to thrombin, which is necessary for the formation of a blood clot. An increase in prothrombin time usually results in an increased bleeding time. This increase in bleeding time could cause fatal hemorrhaging in certain instances. Furthermore, Mustard, et. al. also found that aspirin decreases the stickiness of the platelets. This would indicate that the platelets will not form a clot as quickly as they would under normal conditions. The lack of cohesiveness among the platelets could also increase the bleeding time.

Other reported adverse reactions of aspirin occur in various systems of the body(1,11). The central nervous sysem side effects include dizziness, headache and somnolence. Reported adverse reactions associated with the cardiovascular system are palpitations and tachycardia. Dermatological side effects include rash, puruitus and urticaria. Problems associated with the special senses are tinnitus, loss of hearing and visual disturbances. Symptoms such as dizziness, palpitations, tachycardia, loss of hearing and visual acuity loss could be dangerous to an athlete if they occurred during a game or practice. Luckily, these symptoms occur infrequently and only when large doses are ingested. These adverse reactions can be alleviated by decreasing the amount of aspirin ingested.

Kinetics of Oral Administration

After two aspirin tablets are taken with an aqueous solution they usually begin to dissolve, but this is dependent upon the composition of the tablets(10). Absorption of the drug begins in the stomach and is completed in the small intestine. All orally administered drugs pass from the gastrointestinal tract to the liver via the portal hepatic vein before entering the general system(15). The liver acts as a filter to prevent impurities for entering the system. Approximately 68 percent of the aspirin reaches the peripheral circulation intact. The mean plasma half-life (the time it takes for one- half of the drug in the system to be excreted) of the aspirin ranges from 4.5 to 16 minutes. Although it has not been proven, many researchers believe that the half- life of the drug determines the length of time the drug exerts an effect upon the body.

The composition of the tablet affects the amount of aspirin in the blood stream(10). Various buffering agents added to the aspirin to form the tablet dissolve at different rates in the presence of water. Sodium bicarbonate, magnesium carbonate and calcium carbonate formulation dissolve very quickly. Sodium ascorbate and sodium citrate combinations dissolve rapidly in water while magnesium hydroxide, magnesium oxide and magnesium trisilicate dissolve slowly in water, but rapidly in the presence of hydrochloric acid. This means that some tablets will begin to dissolve in the mouth while the other tablets will only dissolve in the acidic environment of the stomach. The longer it takes the tablet to dissolve the longer it takes the drug to reach the site of the pain or inflammation.

Drug Interactions

Aspirin has been observed to interact with various other drugs. In large doses of aspirin, i.e. more than 1200 mg. daily for more than a week, a deficiency of vitamin C may develop(2). An increase in the daily consumption of fruits and vegetables containing vitamin C or the use of supplemental vitamin C tablets will help to prevent this problem from occurring.

Acetaminophen and aspirin do not seem to interact when taken concurrently(3). One drug does not increase nor decrease the effects of the other drug. This means that concurrent ingestion of aspirin and acetaminophen does not relieve pain any faster nor do the effects last longer.

Concurrent ingestion of alcohol and aspirin can enhance the occult bleeding and gastrointestinal damage induced by the aspirin in persons with a history of gastrointestinal problems(2). There is no proof that the concurrent use of aspirin and alcohol is more harmful than either drug taken by itself in persons who do not have any gastrointestinal problems.

Many doctors prescribe aspirin and codeine compounds for pain(1, 8). Aspirin enhances the analgesic properties of the codeine, thus, relieving the pain more efficiently.

Indomethacin (Indocin) and naproxen (Naprosyn) interact with aspirin. Indomethacin serum levels are lowered in the presence of aspirin(2). It is believed that indomethacin and aspirin compete in the gastrointestinal tract for absorption. This could lead to an increase in GI distress. It has been suggested that indomethacin be administered rectally when aspirin is given orally(12). This practice would not be practical in athletics. When naproxen and aspirin are concomitantly administered there is a lowering of the serum naproxen levels(16). There is also an increase in the urinaryclearance of naproxen, which would suggest that aspirin and naproxen compete for receptor sites, as opposed to competing for absorption in the stomach and small intestine. Since the aspirin fills the receptor sites before the naproxen, there is more naproxen floating in the blood stream which must be filtered out by the kidneys. The lower serum naproxen levels means that there will be a decrease in the analgesic, anti-inflammatory and anti-pyretic properties associated with naproxen. The clinical significance of this interaction is unknown at this time.

Concurrent use of anticoagulants and aspirin could lead to hypoprothrombinemia, or a deficiency of prothrombin in the blood, when large doses, ie. three grams or more daily, of aspirin are used[2]. In smaller doses, ie. one gram daily, of aspirin, unwanted bleeding usually results. This unwanted bleeding usually occurs in the form of GI hemorrhage by intensifying the bleeding associated with the oral administration of aspirin.

Antibiotics and aspirin interactions occur frequently[18]. Aspirin has demonstrated a synergistic effect upon kanamycin sulfate (Kantrex), oleandomycin phosphate, penicillin G sodium, ampicillin sodium (Ampicillin), oxacillin sodium, naficillin sodium (Unipen), polymycin B sulfate (Aerosporin), chlortetracycline hydrochloride, and novobiocin sodium (Albamycin Sodium). Aspirin has demonstrated an antagonistic effect upon neomucin sulfate. Concurrent administration of neomycin sulfate and aspirin could decrease the effectiveness of the antibiotic.

Toxicity

Since aspirin overdose can occur through the administration of "therapeutic" doses of the drug it is important for the athletic trainer to be familiar with the signs and symptoms of aspirin intoxication in order to prevent fatal overdoses. The athletic trainer should also be aware of the medical management of aspirin overdose so that he will not allow anything that may impede the physician's attempt to treat the overdose to occur.

Children are most often poisoned by "therapeutic" overdoses. The symptoms of intoxication in children include hyperventilation, decreased respiration in the later stages, metabolic acidosis, ketosis, hyperglycemia or hypoglycemia, and twitching(1). Dehydration and electrolyte imbalance occur as a result of vomiting. Occasionally, internal hemorrhaging occurs(6). The early symptoms may include lethargy and episodic hyperpnea, or an abnormal respiration rate[1].

Adults experience lethargy, episodic hyperpnea, tinnitus, and headache in the early stages of aspirin intoxication[1,6]. In the later stages of intoxication loss of hearing, an increased metabolic rate due to acidosis, hypoglycemia or hyperglycemia, dehydration, and an electrolyte imbalance become apparent. The ototoxic effects are completely reversible, even after large doses of aspirin ingested over a period of years.

Certain symptoms of toxicity, ie. tinnitus, headache, and loss of hearing, occur when large doses of aspirin are ingested. These side effects are alleviated by decreasing the amount of aspirin taken[1].

An antidote commonly used for aspirin overdose is sodium bicarbonate[13]. This drug hastens the elimination of aspirin. Vitamin K or a synthetic substitute is administered to counteract hypoprothrombinemia. In cases of severe intoxication or hemorrhagic complications exchange transfusions may be necessary.

Sellers, et. el.[17] suggested the use of activated charcoal in the case of aspirin intoxication. A single dose of one gram of activated charcoal per kilogram of bodyweight can absorb 17.4 grams of aspirin, or the equivalent of fifty-four 325 mg. tablets.

Conclusions

Buffering agents help to prevent GI upset but they do not prevent gastrointestinal blood loss or damage to the stomach mucosa. The athlete should be made aware of the fact that advertisements for the various aspirin compounds address the problem of stomach upset and not the question of occult bleeding and stomach mucosal damage.

In summary, aspirin exhibits anti-inflammatory, analgesic, and anti-pyretic properties which are helpful in the treatment of various inflammatory condition such as tendonitis and chondromalacia. Aspirin has numerous side effects. The most prominent adverse reaction associated with the oral administration of this drug is gastrointestinal bleeding. Large doses of aspirin taken over an extended period of time may cause irreversible damage to the stomach mucosa. Aspirin has been known to interact with antibiotics, alcohol, anticoagulants, and other anti-inflammatory agents. Symptoms of an overdose, such as tinnitus, headache, and loss of hearing, can occur when large doses are ingested. These symptoms subside when the dosage is reduced. If intoxication occurs, the athlete should be taken to a physician or hospital for emergency care. +

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A Case Report:

High Galvanic Therapy in the Symptomatic Management of Acute Tibial Fracture

Wayne Smith, ATC RPT

While the therapeutic applications of low galvanic current are well documented in treating acute sprains and strains, the literature is notably scarce in the use of high galvanic therapy being utilized for early management of swelling and muscle spasm in simple fracture cases.(1,2,3) Such an application is described in this report, where high galvanic current was employed successfully in treating the acute symptoms of a tibial fracture in an eighteen year old Coast Guard Recruit.

Case Report

An eighteen year old male Caucasian was completing his final physical fitness run when he felt a sudden pain in his lower left leg rendering him unable to complete the run. The injured man was thereupon ambulanced to the dispensary and received immediate attention by the duty medical officer, who elicited a negative history of any previous pain or trauma to the involved leg prior to injury. The physical examination of the lower left extremity revealed no gross deformities, palpable tenderness in the upper 1/3 of left tibia, moderate swelling of the anterior lateral muscle group, accompanied by protective spasm, decreased range of motion of ankle and knee and pain on weight bearing. A provisional diagnosis of lateral compartment strain was made whereupon the leg was immobilized and the patient admitted to the ward pending further evaluation. In the meantime physical therapy in the form of ice and 60 minutes of 120 volts, negative polarity high galvanic current from a model 100 EGS unit was administered (Fig. 1). This treatment was repeated twice within a four hour period. Examination at the four hour point of therapy revealed a 2 cm swelling reduction, decreased muscle spasm, and significant improvement in left lower extremity range of motion (passively effected). The above ice and galvanic application was again repeated twice on the second day of post injury; when the degree of swelling was observed to be static from that of the first day.

The attending physician reassessed the patient's condition and ordered X rays in order to rule out stress fracture. The radiological report confirmed existence of a transverse fracture of the upper tibia (Fig. 2). The patient was transferred to orthopedic clinic for casting.

Discussion:

When an injury to the body occurs such as a fracture, muscle spasm and swelling results. Pain impulses emanating from the broken edges of bone cause the surrounding muscles to tonically contract. In addition, cell trauma to the interstitial tissues will produce swelling. In this instance the early application of high galvanic current proved effective in countering the advance of swelling and spasm.

Low voltage galvanic current has been employed in controlling muscle spasm and tissue swelling since the late 1800's(2,4). However, the primary difference between low voltage and high voltage direct current is the pulse duration and amperage. When using low volt DC, current strength must be gaged in milliamperage which is the primary guide to DC dosage. A steadily flowing low

Mr. Smith is currently serving as Chief Physical Therapist and Athletic Trainer, U.S. Coast Guard Training Center, Cape May, New Jersey, as well as being a part time graduate student in the Sports Medicine Program, Temple University, Pennsylvania.

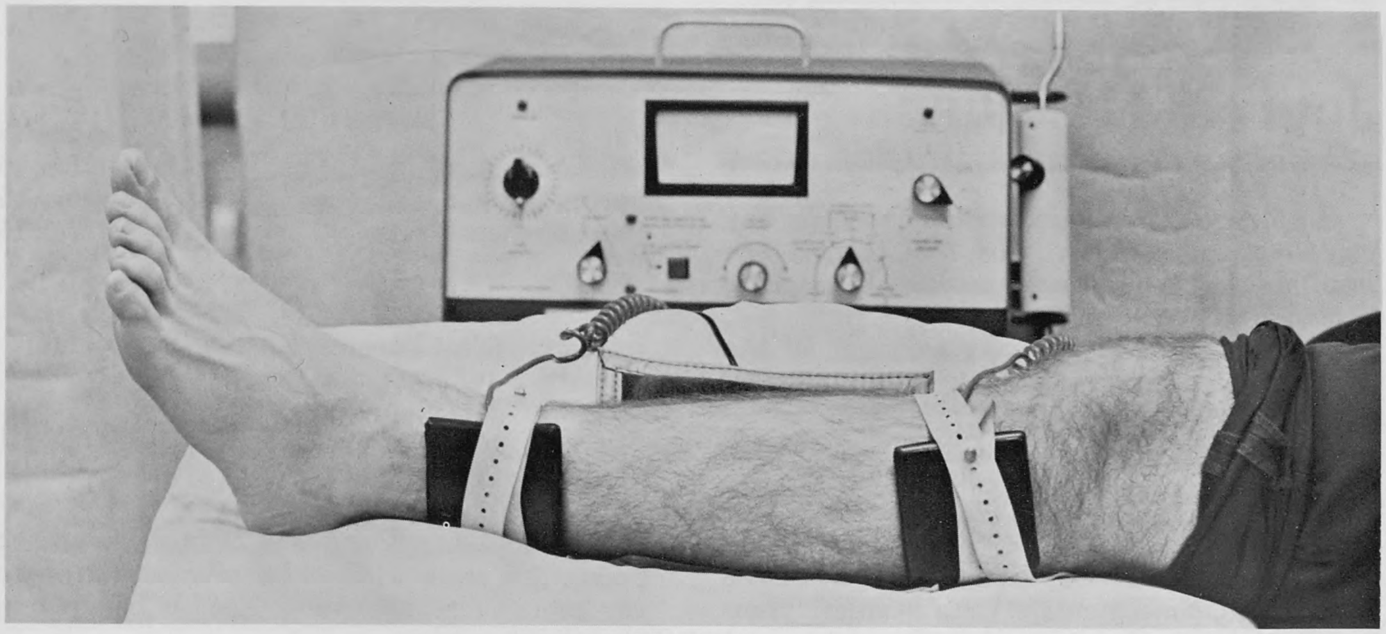

FIGURE 1

FIGURE 2

voltage direct current produces no significant muscle contraction. Patient tolerance to it varies, closely approaching the point at which actual tissue damage might occur. Thus low volt DC is usually limited to one milliamperage per square inch of electrode surface.(4)

High voltage direct current with its micro amperage and interruptive pulse capabilities is more attuned to the physiological state of the body's tissue, which permits the safe introduction of more current into injured areas enabling better repolarization and less discomfort to the patient.

In the case discussed here, high voltage galvanic therapy was employed to reduce swelling and spasm in an apparent strain injury but which ultimately proved to be an acute fracture. Yet the demonstrated positive effect in reducing both swelling and spasm suggests future studies in the broader utilization of high voltage for immediate treatment of acute simple fractures prior to casting. +

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Journal Deadlines

In order to avoid confusion and delays for any contributions you have for the Journal the deadlines for various sections of the Journal are provided below.

Send all materials for any selection of the Journal other than formal articles and "Calendar of Events" to:

Ken Wolfert
Miami University
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This includes sections such as "Tips From the Field," "Announcements," "Case Studies," "Letters to the Editor," etc. The deadlines are:

Journal	**Deadline**
Fall Issue	June 15
Winter Issue	September 15
Spring Issue	December 15
Summer Issue	March 15

Deadline for "Calendar of Events": Information on upcoming events should be sent to:

Jeff Fair, ATC
Athletic Department
Oklahoma State University
Stillwater, Oklahoma 74074

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Spring Issue	December 15
Summer Issue	March 15

Manuscripts must be sent to:

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East Lansing, Michigan 48824
(517) 353-4412

The Editorial Board will then review each paper and work with authors to help prepare the papers for publication. Each is handled on an individual basis.

Guide to Contributors

Athletic Training, the Journal of the National Athletic Association, welcomes the submission of manuscripts which may be of interest to persons engaged in or concerned with the progress of the athletic training profession.

The following recommendations are offered to those submitting manuscripts:

1. Seven copies of the manuscript should be forwarded to the editor and each page typewritten on one side of 8½ x 11 inch plain paper, triple spaced with one inch margins.

2. Good quality color photography is acceptable for accompanying graphics but glossy black and white prints are preferred. Graphs, charts, or figures should be of good quality and clearly presented on white paper with black ink, in a form which will be legible if reduced for publication. Tables must be typed, not hand written.

   All art work to be reproduced should be submitted as black and white line art (either drawn with a Rapidograph [technical fountain pen] or a velox stat or PMT process) with NO tonal values, shading, washes, Zip-a-tone — type screen effects, etc. used.

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   d. Behnke R: Licensure for athletic trainers: problems and solutions. Presented at the 29th Annual Meeting and Clinical Symposium of the National Athletic Trainers Association. Las Vegas, Nev, June 15, 1978.
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5. Manuscripts are reviewed and edited to improve the effectiveness of communication between the author and the readers and to assist the author in a presentation compatible with the accepted style of *Athletic Training.* The initial review process takes from six to eight weeks. The time required to process a manuscript through all phases of review, revision, and editing, to final publication is usually six to eight months depending on the timeliness of the subject. The author accepts responsibility for any major corrections of the manuscript as suggested by the editor.

   Galley proofs of accepted papers are sent to the author for corrections prior to publication. Reprints of the article may be ordered by the author at this time.

6. It is requested that submitting authors include a brief biographical sketch and acceptable black and white glossy photograph of themselves. Please refrain from putting paper clips on any photograph.

7. Unused manuscripts will be returned, when accompanied by a stamped, self-addressed envelope.

Address all manuscripts to:
Clint Thompson
Department of Athletics
Michigan State University
East Lansing, Michigan 48824

The following recommendations are offered to those submitting CASE HISTORIES:

1. The above recommendations for submitting manuscripts apply to case studies as well but only two-copies of report need be sent to the Editor-in-Chief.
2. All titles should be brief within descriptive limits. The name of the disability treated should be included in the title if it is the relevent factor; if the technique or kind of treatment used is the principal reason for the report, this should be in the title. Often both should appear. Use of subtitles is recommended. Headings and Subheadings are required in the involved report but they are unnecessary in the very short report.

   Names of patients are not to be used, only 3rd person pronouns.
3. An outline of the report should include the following components:
   a. Personal data (age, sex, race, marital status, and occupation when relevant)
   b. Chief complaint
   c. History of present complaint (including symptoms)
   d. Results of physical examination (Example: "Physical findings relevant to the physical therapy program were . . .")
   e. Medical history - surgery, laboratory exam, etc.
   f. Diagnosis
   g. Treatment and clinical course (rehabilitation until and after return to competition) use charts, graphs when possible
   h. Criteria for return to competition
   i. Deviation from the expected
   j. Results - days missed

4. **Release Form**
   It is mandatory that *Athletic Training* receives along with the submitted case a signed release form by the individual being discussed in the case study injury situation. Case studies will be returned if the release is not included.

Potpourri

Dennis Aten, ATC, RPT, MS
Eastern Illinois University

Malignant Hyperthermia

Is it possible that genetic factors influence susceptibility to heat stress illness in athletics? According to Dr. Daniel Wingard, a University of Nebraska Medical Center researcher, 3 to 5 percent of the population carries the malignant hyperthermia susceptible gene. He feels that, although MH is usually connected with anesthesia deaths on the operating table, it may also be a factor in many "heat stroke" deaths in athletics.

MH is believed to be a neuromuscular disorder where muscles may contract simultaneously causing rapid increase in temperature. As a muscular disorder it may be a factor in scoliosis, eye problems, and a propensity toward musculo-skeletal trauma. Apparently, susceptible people also have a more difficult time getting into shape, especially in hot weather. This may account for many athletes who require greater periods of time to condition themselves. These people may also be more susceptible to cramping, other muscular distress, and loose joints. Trauma seems to make the reaction to MH worse.

Dr. Wingard is concerned about the lack of interest or concern in the sports medicine community. It is too early in his research to determine how prevalent this problem is in athletics. Many other pertinent questions remain unanswered, but it is hoped that much greater insight into the MH problem in athletics will be learned within the year. In the meantime, it is suggested that athletic trainers discuss this problem with their team physicians. Hopefully, this can lead to greater concern, interest, and eventually knowledge regarding a potential threat to the safety and welfare of our athletes.

Suggestions for Athletic Programs

From "United States Sports Academy News"

The following ten suggestions for preventing the high school athlete from becoming the loser in a confrontation between coach and trainer have been used successfully in several model athletic training programs.

One. "Coaches coach. Trainers train. The trainer should be answerable only to the A.D., physician, and headmaster or principal."

Two. Trainer and coach should review the following areas before the season: equipment, conditioning program, flexibilities, warm-up procedures, and physical exam.

Three. It is up to the trainer to acquaint the coach with emergency medical procedures. These procedures should be *in writing.*

Four. The A.D. and trainer should establish a flow chart for medical care and communications.

Five. Coach and trainer should meet daily to discuss practice and whatever practice adjustments should be made because of weather, equipment, injuries.

Six. The trainer should review with each coach the contents and use/application of all items in the first-aid kit, and the procedures for basic emergency first-aid.

Seven. Don't let a big game influence a decision.

Eight. The coach should support the trainer's decision with players, parents, and students.

Nine. After an injury, the trainer and team physician should set up the player's therapy and rehabilitation program. After that, it's up to the coach *and* trainer to see that the procedure is followed.

Ten. You, the trainer, should stand in the mainstream of the fast-moving field of sports medicine and spread the word.

Second Opinions

From "Family Weekly," a newspaper magazine

Most people seek a second medical opinion after being told they need surgery, but how often do the opinions of the two physicians agree? According to a report in the New England Journal of Medicine, 88.7 percent of 1,591 patients who were told they needed surgery had the recommendation confirmed by a second doctor; of the patients who received conflicting opinions, 69.5 percent then had their need for surgery confirmed by a third physician.

Another Use for Microwave Ovens

From July 20, 1980, "Every Inch and 1/2"

"The resourcefulness of patients and their families never ceases to amaze me. The wife of one of our patients who recently underwent a Marmar TKR came up with a clever idea for moist heat at home. She merely dampened towels and folded them the way she was going to place them, then heated them in her microwave oven for 2 minutes. The result — piping-hot towels without the fuss and muss of wringing and running before they cooled off." (Nadine Richard, RPT, Chief PT, Nashoba Community Hospital, 200 Groton Rd., Ayer, MA 01440.)

College Offers Facility for Aquatic Therapy

Every weekday morning from 11 till noon the Mount Holyoke College pool is reserved for a special constituency — men and women recovering from post-fracture or post-operative surgery. Ruth Elvedt, professor of physical education, who has a special interest in aquatic rehabilitation organized and promoted an opportunity which helps these people return to a normal active life more quickly.

During a sabbatical in spring, 1979, Miss Elvedt conferred with prominent orthopedic specialists (with particular interests in sports medicine) and physical therapists and gained support of her hypothesis. "A buoyant supportive environment makes movement easier, less painful and enhances relaxation; flexibility and endurance improve readily and the circulatory system is stimulated so that a likely reduction of swelling (edema) occurs. Consequently, muscle toning and a wider range of motion as well as earlier ambulation can be expected.

"Actually, water exercise and/or swimming is not a new idea at all," she continues, "but all too few people realize that 'the aquatic way' can be a superb means of rehabilitation and a fun way to fitness. Mount Holyoke should be proud to be one of the first colleges in the country to offer its facilities for independent aquatic therapy," Miss Elvedt notes.

With medical advice and approval, she designed a medical data form which doctors can use to direct patients to an aquatic exercise program. This helps to bridge a doctor-patient communication gap and provides evidence that the individual is ready to participate in water exercise activity.

Strength Increases with Proper Mouthguard

Summary of Study by Stephen D. Smith, D.M.D.
Founder and Clinical Director
Temporomandibular Orthopedic Clinic
Philadelphia College of Osteopathic Medicine
Philadelphia, PA

Measurements were taken subjectively and objectively on football players comparing teeth together versus mouthguard in comparison to after mouthguard bite adjustment. Invariably, the mouthguard was beneficial showing increasing strength through arm muscle testing after proper bite adjustment was done kinesiologically. The key to the strength improvement was from combining pivotal molar support with bilateral, even muscular occlusal contact. This factor was complied with lessened incisal area mouthguard contact in the bites evaluated. +

FORT WORTH '81

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Comparison of Quad to Ham Strength Ratios of An Intercollegiate Soccer Team

Dean E. Laird, ATC, MS

Introduction

Muscular strength imbalances and inflexibility are precipitating factors for hamstring strains according to Klafs and Arnheim(2). Burkett(1) tested 30 track and field athletes and predicted hamstring strain in athletes that had a strength imbalance of 10% or more between the hamstring muscle groups. Further, he found that those athletes not sustaining hamstring strains had a quadriceps/hamstring ratio of .6. This is the strength ratio suggested by Klein and Allman(3) and others(4,7). Uram, as cited by Sheehan(6) believes a strength ratio of 7:3 quadriceps to hamstrings greatly predisposes the athlete to hamstring strain.

This study was undertaken to determine the quadricep/hamstring ratio of an intercollegiate soccer team. The strength ratio of the quadriceps and hamstrings were compared for ipsilateral and bilateral strength balance.

Method

Twenty-three (23) members of an NCAA Division II soccer team were administered a 1 RM strength test. The test consisted of knee extension and knee flexion on an Universal Knee machine. Isokinetic testing devices and cable tensiometers were not used for testing due to the unavailability of such equipment. The athlete had three (3) warm-up lifts. The athlete was also requested to perform, prior to the testing, that stretching routine which he performed before soccer practice. The resistance was initially set at 5 lbs. Resistance was increased by 5 lb. increments upon the completion of a satisfactory lift. A satisfactory lift was defined as "a lift through the full range of motion as witnessed by the tester." The final satisfactory lift was recorded. Inadvertently, muscular endurance was also tested due to the fatiguing of the muscle while increasing resistance. The strength test was administered in the following order:

1. Right Quadriceps
2. Left Quadriceps
3. Right Hamstrings
4. Left Hamstrings

A flexibility test was not administered.

The data were compared to determine the strength ratio of the hamstrings to quadriceps for both legs. Also, the strength ratio of the right leg and left leg for both quadriceps and hamstrings were compared. A ratio of .62 + .05 was considered acceptable. This was considered an appropriate level because of two factors. It is reported(6) that the ratio of extensors to flexors should be 3:2 (a ratio of .67). A ratio of .6 extensors to flexors is also reported(5). A ratio of .62 + .05 encompasses both of these ratios. The strength ratio of the right and left quadriceps was considered unacceptable if there was greater than a 10% strength difference. A strength difference of 10% was considered unacceptable for the bilateral hamstring comparison(1).

Results

Quadriceps Femoris Test: Right to Left

Of the twenty-three athletes tested, six had a significant strength imbalance bilaterally between the right and left quadriceps (see Table 1). One of the six athletes with significant strength imbalance sustained two injuries. One during the first week of practice to the foot, due to being kicked and later sustaining a blow to the thigh during the 10th week of the season, during an overtime period. The first injury resulted in 8 practices being missed, while the second injury resulted in 1 day lost from

TABLE 1
Mean Strength, Mean Ratio and Number of Injuries Among 23 Soccer Players

	Right Leg	Left Leg	Ratio	No. Acceptable	No. Injuries Acceptable Group	No. Injuries Unacceptable Group
Quad Strength (lbs)	68.48	67.83	.99	18	2	1
Hamstring Strength (lbs)	35.87	35.00	.98	12	2	1

TABLE 2
Mean Strength, Mean Ratio and Number of Injuries Among 23 Soccer Players

	Quad Strength (lbs)	Hamstring Strength (lbs)	Ratio	No. Acceptable	No. Injuries Acceptable Group	No. Injuries Unacceptable Group
Right Leg	68.48	35.87	.524	6	0	2
Left Leg	67.83	35.00	.516	4	0	1

Mr. Laird is currently employed as the head athletic trainer and adaptive physical education instructor by the New Braunfels Independent School District, Denton, TX 76203.

practice. This athlete had no previous history of injury to either body part.

Hamstrings: Right to Left

The data are presented in Table 1. Eleven of the twenty-three tested had significant strength imbalances. One of these athletes sustained a contusion of the quadriceps during a game. This injury resulted in two days lost from participation. This athlete also had no previous history of injury.

Right Leg Strength Balance: Quadriceps to Hamstrings

These data are presented in Table 2. Of the twenty-three athletes tested, only six had accepted strength ratios in the right leg. All injuries occurred in the unacceptable group. These injuries occurred in the athletes who had the strength imbalances earlier presented.

Left Leg Strength Balance: Quadriceps to Hamstrings

Only five of the athletes tested had an acceptable strength ratio in their left leg. Four of these athletes had acceptable strength ratios in the contralateral limb. No injuries were sustained in the acceptable group.

Discussion

It is interesting to note that none of the athletes sustained muscle strains. The data collected concerning the strength ratios would tend to suggest a higher incidence of muscle strains based upon the suggested strength ratio of the quadriceps to hamstrings. The lack of muscle strains and joint injuries may be due to a number of factors. The flexibility of the athletes may have been a contributory factor in the lack of injuries. A second factor may be that the athletes did not apparently over-extend their physical capabilities. Thirdly, it may be that a suggested strength ratio of quadriceps to hamstrings (3:2) is not a good predictor of muscle strains. The data presented suggests this point.

Summary

Twenty-three members of an intercollegiate soccer team were tested to determine their quadricep to hamstring strength ratio. It was found that only 25% of the team had acceptable ipsilateral strength ratios in the right leg and 20% in the left leg. Approximately 75% had an acceptable bilateral quadriceps strength ratio. However, only 50% had what was considered an acceptable hamstring strength ratio bilaterally. It may be that the 3:2 quadriceps to hamstring ratio is not a good predictor of muscle strains. Further study should be performed to determine if this data can be further supported or refuted. It would also be interesting to find how important flexibility is in conjunction with strength in the prevention of injuries. +

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Medical Communications — Records for the Professional Athletic Trainer

A.J. Gabriel Jr., ATC

In recent years an increasing number of articles have appeared on liability in sports and sportsmedicine. Medical liability experts have called this rise in litigation an epidemic. The prospect for the 1980's is that this epidemic will spread. In medical settings inservices are devoted entirely to the areas of liability and malpractice. Books on medical liability are increasing in the market place. In reviewing three years of hospital experience in nursing, orthopedics and emergency care, this author feels that many practices to reduce liability can be transferred to athletic training. This article deals with one aspect — record keeping. The old adage that, "if it isn't written down — then you didn't do it" can readily apply to an athletic trainer as well as a nurse, therapist, or physician. As coordinator of sportsmedicine for a metropolitan school district of three large high schools (Class AAAA in Iowa) and six junior high schools the task of effective record keeping seemed monumental. Many of the district's athletes are bused, transferred across school boundaries frequently, or are transient. Many of the minority students do not have entry level access to quality health care except at emergency rooms or at the city's community clinic.

Three types of record forms will be presented. Hopefully these can be of use to professional personnel in the high school level. The forms cover three areas: 1) Evaluations, 2) Referrals, and 3) Communications. The forms were tested for at least one semester in a single building before being revised and adapted district-wide.

I. Evaluation: This form is utilized by the athletic trainer. It is a record of injuries that are evaluated and cared for by the athletic trainer. The form was adapted from emergency forms used in the city with the help of M. Herker EMT-A, ATC at North Tama High School, Traer, Iowa. (See Example A.) The form includes vital information (name, telephone number, etc.), the evaluation, and the initial care given the athlete. The bottom section is recommendation for care. The form is three-layered (white, yellow and pink). The top sheet is retained by the athletic trainer for the student-athlete's medical file. The middle sheet stays in the athlete's training room for reference. The last copy is sent to the school nurse for her permanent record. Next year a copy will be added to be routed to the OSHA director for the district. Presently this office receives a photocopy of each report.

II. Referrals: The Waterloo area has four emergency rooms and several dozen family practitioners. Effective communications with those many physicians and/or specialists concerning the status of an athlete is very difficult. A referral form was developed to communicate with area physicians and allow feedback concerning the status of an athlete and recommendations by his/her physician on continued care or treatment. (See Example B.) The form was adopted from one used by Delbert Lark, ATC at Dowling High School in West Des Moines, Iowa. The form is three-layered. The last sheet (pink) is retained by the athletic trainer as a record of the referral. The remaining forms are sent along with the athlete to the physician. The physician retains the middle copy (yellow) for his/her record with the original sent by mail to the Central Clinic. The success rate for the return of these forms are 85% initially, with follow up measures netting 97% of the referral forms. The remaining forms were lost to emergency rooms. In 1981-82, a telephone dictation system will be added so that the attending physician can verbally give orders for care until the written instructions arrive by mail. The form also includes modalities not presently available, but which will be added in the future (i.e., ultrasound).

III. Communications: Two sets of forms were developed to assist the athletic trainers and physicians communicate with the coaches and the parents of the athletes. (See Examples C, D, E, F) The student-athlete status form communicates pertinent information to the coaching staff (See Example G.), while the take home instructions given to athletes outline home care suggestions for the athlete and his/her family to follow. The take home sheets were adapted from forms used in the city's emergency rooms and recommended by the Academy of Orthopaedic Surgeons.

All forms are printed by the district's vocational printing class. It was felt that a professional looking form would be better received. Past experiences with mimeographed forms compared with a professionally printed form show the professional forms having a better rate of

WATERLOO COMMUNITY SCHOOLS
Sportsmedicine Services
INJURY REPORT FORM-ATHLETICS

CONFIDENTIAL INFORMATION

Name ____________
Age ____________ 1 2 3 4 M F
School ____________
Sport ____________
Date ____________ Time ____________
Phone ____________

INJURY (Specific as possible)
COMPLAINT:
HOW:
WHEN:

Practice ( ) Game ( )
School ( ) Away ( )
School Insurance ( )
Carrier ____________
Coach: ____________

INTIAL CARE GIVEN: Vitals (If applicable)

EVALUATION: (Athletic Therapist)
OBSERVATION
PALPATION
MANIPULATION:
ROM:
active
passive

TESTINGS:
CLINICAL IMPRESSION:

RECONDITIONING RECOMMENDATION:
I.C. E. ____________ a day for ________ days
Wrap ( ) Splint ( ) Crutches ( )
Referred to Family Physician ( )
Referred to: ER ( ) Team Orthopeadist ( )
Instructions sent home ( ) Parents called ( )
Support: Games ( ) Practices ( ) Both ( )
Other Instructions:

____________, ATC
signature

REHABILITATION:

Cryotherapy	( )	Bath
	( )	Pack
	( )	Massage
Hydrotherapy	( )	Hot
	( )	Cold
Parrafin	( )	
Hydrocollator	( )	
Exercise: Active	( )	Pass. ( )
Flex.	( )	
P.R.E.	( )	

SPECIFIC INSTRUCTIONS ARE ON PROGRESS AND ORDER SHEETS AS DIRECTED BY PHYSICIANS
REFER ANY QUESTIONS TO THE ATHLETIC TRAINER FOR CLARIFICATION. THANK YOU. Form 740

Example A.

Mr. Gabriel is the coordinator of sportsmedicine with the Waterloo Community Schools, Waterloo, Iowa 50702.

WATERLOO COMMUNITY SCHOOLS
Sportsmedicine Services
Central Clinic
Central High School
1350 South Hackett Road
Phone (319) 235-9591 Ext. 70
or 232-6384

Date________

Name________
School________ Team________
Grade________ Sex M F
Age________
Phone________
Sport________
Allergies________

INJURY REPORT — Vitals (If applicable)

Observation

Manipulation

Palpation

Neurological

INITIAL CARE GIVEN

Time (Military)________ Signed________
Title________

PHYSICIAN'S REPORT — Doctor: Please return this form by mail to the above address. This is used as a release form.

DIAGNOSIS________

PROGNOSIS________

Precautions or limitations________

Parts to be treated________

Date of reexamination________

TREATMENT ORDERS:

- ☐ Therapeutic Exercises - Specific
  - ☐ Ambulation - unassisted
  - ☐ Ambulation - crutches
  - ☐ Burger
  - ☐ Codman
  - ☐ Williams
- ☐ Therapeutic Exercise - General
  - ☐ Passive
  - ☐ Active
  - ☐ Resistive
  - ☐ Progressive Resistive
- ☐ Other________
- ☐ Heat
  - ☐ Hot packs (superficial, moist)
  - ☐ Infra-red (radiant, superficial, dry)
  - ☐ Paraffin (superficial, moist)
- ☐ Cold
  - ☐ Ice massage
  - ☐ Pack type (moist, short application)
- ☐ Hydrotherapy
  - ☐ Contrast bath (alternate hot/cold)
  - ☐ Whirlpool (arm, leg, full body)
- ☐ Massage
- ☐ Ultrasound (deep, dry heat)

Frequency of treatment: Daily for________days.
Twice daily for________ days.

________MD
Physician's signature

Routing: White – School   Yellow – Physician's   Pink – Reporter

Example B.

Waterloo Public Schools
Sportsmedicine Services

BACK AND NECK INJURY

1. Use heat or cold on the injuried area - which ever is indicated by the physician and/or athletic trainer. If no preference is given, use what ever seems to help the most, however, ice has been found to be the most effective. Be careful not to burn yourself or get frozen.
2. Rest and relax as much as possible until the condition improves.
3. Avoid activities that will aggravate the injuried area.
4. Gentle but firm massage will increase circulation in sore muscles and will help clear the soreness. But: do not massage over a bruise, infection or swelling.

GENERAL INSTRUCTIONS

_____ Call to arrange an appointment to see your doctor for follow up care. Call sooner if you think necessary.
_____ Follow any additional instructions given by the team phsician and/or team athletic trainer.
_____ Avoid any use of the injuried part.
_____ Allow only limited use of the part.
_____ You need not limit activity necessarily.
_____ Check back with the athletic trainer as soon as possible, even if you feel better: such as the next regular practice day.

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Example E.

WATERLOO COMMUNITY SCHOOLS
Sportsmedicine Services
1350 South Hackett Road
Waterloo, Iowa 50701
319-235-9591 extent.38

Form 747

STUDENT-ATHLETE STATUS REPORT:
Route to:________
Building:________
Date:________ 19____

Student: — Evaluations & Recommendations;

Example G.

Waterloo Public Schools
Sportsmedicine Services

SPRAINS OR MINOR FRACTURES

1. Injuries of the wrist, elbow, or shoulder may need immoblization with a sling or a bandage.
2. Keep your injuried arm elevated on one or two pillows/or elevate injuried leg on chair for 4-12 hours.
3. Apply ice bags to the injuried area for the first 72 hours. You can use a towel or cloth between the ice bag to prevent freezing.
4. After 72 hours - apply heat to the area, warm water is best.
5. Use an elastic wrap on the area to reduce pain, support area and reduce swelling.
6. Elastic wrap may become too tight or too loose. If it is too tight, the fingers and/or toes may become pale, numb or painful. In the event it has to be re-applied, remember it should be wrapped evenly and snuggly, but not with too much pressure.

GENERAL INSTRUCTIONS

_____ Suggest a trip to an emergency and/or your doctor for X-rays or follow-up care.
_____ Follow any additional instructions from the team physician and/or trainer.
_____ Avoid any use of the affected part.
_____ Allow only limited use of the injuried part.
_____ You need not necessarily limit activity.
_____ Check back with the athletic trainer even if you feel better.

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Example C.

Waterloo Public Schools
Sportsmedicine Services

HEAD INJURIES

1. Limited activity for 24 hours. May mean no school if injury on a weekday.
2. Eat light diet for the next 8-24 hours.
3. Apply ice to head for discomfort and swelling.
4. Appearance of any of the following signs means that you should consult a doctor immediately:
   1. Nausea and/or vomiting.
   2. Generalized weakness or numbness of arms or legs.
   3. Any visual difficulties or dizziness.
   4. Mental confusion or disorientation.
   5. Unusual sleepiness or difficulties awakening.
   6. Persistent headaches after 48 hours.

GENERAL INSTRUCTIONS

_____ Call to arrange an appointment to see your doctor for followup care. Call sooner if you think necessary.
_____ Go to an emergency room as soon as possible for a evaluation.
_____ Follow any further instructions of the team physician and/or athletic trainer.

4/79

Example D.

Waterloo Public Schools
Sportsmedicine Services

WOUNDS OR CUTS

1. Keep wounds clean and dry, unless indicated otherwise by team phsician or athletic trainer.
2. Elevate the wound if located on arm or leg to relieve discomfort.
3. Check for signs of infection:
   a. Swelling
   b. Excess redness
   c. Excessive pain
   d. Heat over the injuried area; elevated temp
   e. Excessive drainage from wound or cut
4. If dressing needs to be changed, you should:

   _____ Change as needed using sterile dressings
   _____ Call your doctor
   _____ Go to the emergency room
   _____ See your athletic trainer

GENERAL INSTRUCTIONS

_____ Go to your emergency room for follow up care or call your doctor.
_____ Follow any additional instructions given by the team physician and/or athletic trainer.

Example F.

return. Using the mail service has also increased the return of the referral form.

If liability and professionalism are to be maintained a certain amount of paperwork appears to be inevitable. By documentation, liability has been reduced in other allied health fields, and can also be the case in athletic training. In the Waterloo Community Schools the use of three-layered forms has reduced miscommunications and resulted in better health care.

Editor's Note: Anyone wishing to have an idea, technique, etc. considered for this section should send one copy to **Ken Wolfert, Miami University, Oxford, Ohio 45056.** *Copy should be typewritten, brief, and concise, using high quality illustrations and/or black and white glossy prints.*

Abstracts

ABSTRACTS EDITOR
John Wells, ATC, PT, PhD
Mars Hill College

"Muscle Blood Flow Changes in Response to 915 MHz Diathermy with Surface Cooling as Measured by Xe^{133} Clearance," Sekins, KM, et.a., *Archives of Physical Medicine and Rehabilitation* 61: 105-113, 1980.

The application of heat to diseased or injured tissue is a fundamental principle of therapy upon which much of the practice of physical medicine is based. Few quantitative studies are found which investigate the local blood flow response in humans to localized deep heating, particularly in regard to microwave diathermy, the most effective modality for the deep heating of muscle. Lehmann, deLateur and co-workers have demonstrated the clinical therapeutic effectiveness of the 915 MHz direct-contact microwave diathermy applicator. This particular applicator is most suitable because of its direct coupling of energy to the tissue with minimal stray radiation losses, thereby permitting an accurate measurement and control of the microwave energy dose. This particular applicator design also utilizes the flow of cold air through a plastic surface grid at its base to prevent unacceptably high skin and subcutaneous tissue temperatures, providing a means for "focusing" the thermal energy deeper into the muscle. A suitable technique for local measurement of human muscle blood flow involves monitoring the clearance of radioisotopic tracer substances. The use of Xe^{133} (in saline) as the tracer is advantageous because it uniformly labels the muscle. Ten minutes of heating was prudent from the standpoint of safety and that this period was reasonable for the diathermy treatment with simultaneous surface cooling to elicit higher, if not precisely maximal, blood flow rates from these particular depths into the muscle. Microwave heating for 10 minutes at moderate power (33 watts net) without cooling showed that a 10-fold increase in blood flow may be obtained at 1.5 cm depth, and yet with cooling this perfusion level is suppressed to a fraction of this increase, even at higher rates of power deposition (40 watts net). The data accentuates the ability of this particular diathermy device to "focus" perfusion and temperature into the muscle bed, thus providing a means for concentrating the therapeutic effects deep into the tissue while simultaneously maintaining safe superficial temperatures.

Andy Behl

"Joint Looseness: A Function of the Person and the Joint," Marshall, John L et. al., *Medicine and Science in Spots and Exercise* 12(3): 189-194, March, 1980.

Recent research suggests that joint-looseness may be considered a characteristic of a person (a trait) and that perhaps it may be possible to validly array individuals on a loose-tight scale. Two ways of demonstrating the validity of a total measure of joint-looseness are available. The validity of an overall measure of looseness would be enhanced if the total indicator correlates with age and/or performance. The purpose of this study was to determine joint-looseness is a characteristic of a person (a trait), or whether the concept can only be applied to a particular joint. Each of 124 preadolescent and adolescent boys and girls were tested on a series of 13 joint-looseness tests administered to non-injured joints. Scores for each joint-looseness test were compared to a total joint-looseness score on the 13 tests as well as to scores on selected skill tests and anthropometric measures. The results of the tests for joint-looseness were inter-correlated with one another and with total score. All of the correlations which were significant ($P < .05$) are presented. These correlations provide evidence that joint-looseness is a function of both the joint(s) and of a characteristic or trait of the person. Females were significantly more loose than males in four of the joint-looseness tests. However, the total joint-looseness score was not correlated with sex. The joint-looseness trait is inversely related to age; as age increases, total joint-looseness decreases. Simple correlations between performance of the fitness tests and the joint-looseness trait were found. This enhances the validity of the total joint-looseness score. It remains to be determined whether joint-looseness plays a differential role in predicting performance when a task does and does not require changing direction and acceleration under conditions of load.

Charlie Urban

"Nocturnal Leg Muscle Cramps," Weiner, Israel H, MD, and Weiner, Henry L, *Journal of the American Medical Association* 244:2332-2333, November 21, 1980.

Nocturnal leg muscle cramping (NLMC) is a frequent complaint heard by physicians in all specialties, from patients of all age groups, though probably most common in elderly. Such muscle cramping usually involves the calf muscles (gastrocnemius or soleus) or the small intrinsic muscles of the sole of the foot. Leg cramps usually occur at night in bed and are precipitated by random muscle contraction or more frequently, by voluntary stretching movements of the lower extremities. Nocturnal leg muscle cramping is sharply differentiated from leg cramps that occur from exercise such as walking or running. In ordinary function, active contraction of the calf muscles causes plantar flexion of the foot. In such passive plantar flexion, the calf muscles, gastrocnemius and soleus, are not contracted, but flaccid and tensionless. Thus, simply, NLMC is due to sudden contraction of the calf muscles with the foot in a passively plantar flexed position, from which the involved muscles shorten beyond physiological limit into a painful cramp. Nocturnal leg muscle cramping can be avoided by minimizing the passive plantar flexed position of the foot. Most important, patients should be instructed to learn to stretch their legs consciously with the feet dorsiflexed rather than plantar flexed. Considering this mechanical basis of NLMC, it is apparent that the best treatment is also mechanical. Daniell has suggested a prophylactic stretching exercise of the calf muscles that he states to have been effective in approximately one half of his patients. This exercise consists of standing and facing a wall approximately 1m away and then leaning forward while keeping the heels in contact with the floor. This position was held for 10s and then repeated after a 5s period of relaxation. Similar leg cramps can occur during swimming, and the mechanism is the same as in NLMC. Good swimming form requires kicking with the toes sharply pointed, that is, with the feet and toes extremely plantar flexed. The maximal muscle contraction involved in vigorous swimming can then precipitate muscle cramping exactly as it occurs in NLMC.

John Welch

"The Effect of Calcium on Muscle Fatigue," John H Richardson, MD, et. a., *The Journal of Sports Medicine and Physical Fitness* 149-151, June, 1980.

Forty Sprague-Dawley male rats were fed identical diets and maintained under constant environmental surroundings. Twenty of the animals served as a control group, while the other twenty were dosed for 60 days with 10mg of calcium supplement added to their water. Half of the animals in the control and experimental groups were exercised on a Wahmann exercise wheel for two weeks. At the end of the 60 days dosing period the animals were anesthetized and the gastrocnemius muscle isolated. The Achilles tendon was attached to a spring loaded myograph of controlled tension. A total of forty measurements were collected, twenty from the control and twenty from the calcium supplemented animals. Both calcium and exercise were effective in prolonging time for the onset of fatigue in striated muscle, but conclusions from this experiment indicate that calcium is more effective than exercise in increasing fatigue time for striated muscle. Further studies with heart and skeletal muscle prove that the strength of the contraction depends on the quantity of calcium that is available to the contractile protein. In addition (Huddard and Price 1975) found that calcium uptake is roughly proportional to the total extracellular calcium. Deprivation of extracellular calcium eventually inhibits contraction in skeletal, cardiac, and smooth muscle, indicating the importance of calcium exchanges which take place between intracellular muscle cells and their extracellular fluids. It is thought that a calcium supplement added to the diet would tend to increase stamina by prolonging muscle contraction.

Tom Rolen

"Patterns of Tibial Rotary Torque in Knees of Healthy Subjects," Osternig, Louis R, et.a., *Medicine and Science in Sports and Exercise* 12: 195-199, 1980.

Excessive tibial rotation has been identified as a prime mechanism in producing disruption of the integrity of the knee joint ligamentous structures. Attempts to measure selected functional knee joint parameters have yielded discrepant results, particularly in the assessment of dynamic muscular torque and tibio-femoral rotation. The purpose of this study was to assess maximum active tibial rotation on twenty-eight healthy males utilizing a technique designed to stabilize the foot and thigh. The data for total tibial rotary range of motion at 90 degrees of knee flexion are in agreement with previous investigators who estimated this parameter at 50 to 60 degrees. At both 90 and 45 degrees of knee flexion, mean internal tibial rotation was 26-38% greater when measured from the relaxed neutral position than from the position with the foot perpendicular to the body's frontal plane. This finding underscores the importance of defining the neutral position accurately before beginning assessment procedures of this type. Although the mean variations for maximum torque between contralateral limbs were somewhat larger than values for range of motion, they still suggest a moderate degree of right and left symmetry. The finding of less tibial rotary range of motion at the 45 degree position is consistent with previous reports which indicated that the amount of tibial rotation possible decreases as the knee joint is extended from 90 degrees. The torque data revealed that all subjects generated close to their highest muscular forces within the first 10 degrees of active rotation. The relatively small absolute difference between contralateral limbs for total range of motion lend support to the commonly practiced clinical technique of comparing the tibial rotation of an injured limb with the healthy contralateral counterpart in order to estimate the severity of joint sprains.

Marty Erb

"Groin Injuries in Athletes," Renstrom, P and Peterson,L *British Journal of Sports Medicine* 14:30-36, March, 1980.

Groin injuries in athletics are being recognized more often in sports, especially football. A (recent European) study revealed that 5% of all injuries were localized in the groin region. Seventeen teams were studied to identify the injuries occurring in the groin region. Tenoperiostitis and strains to the adductor longus were most common injuries. These were identified by inflammation seen in the region of the adductor origin. Tenoperiostitis and strains of the iliopsoas were the second most common injury seen. In these injuries pain was usually located above the hip joint. Another common injury, that is often confused with injuries to the adductor longus, were rectus abdominus tenoperiostitis and strains. They were accompanied by pain while raising the leg with the head elevated. Other, less common, injuries seen were: injuries to other muscle groups in the groin region, that assist in adduction of the leg, fractures, hip joint changes, nerve entrapments, hernias, tumors, ureteric calculi, intra-abdominal inflammation, and gynaecological disease. Treatment of these injuries started immediately. Rest was indicated, but participation in limited activities, avoiding painful movement, were maintained. Ultrasound and hot packs were indicated. Heparin injections were often administered in acute as well as chronic cases. Infiltration with cortisone was given only on strict indications to athletes with long-lasting pain.

Tim Garl

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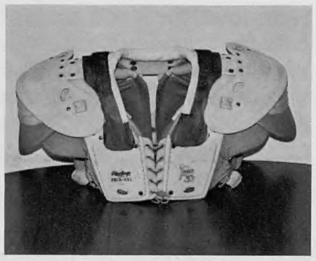

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